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IN

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BEING A CONTINUATION, ON AN ENLARGED PLAN,

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A WORK ORIGINALLY UNDERTAKEN IN THE YEAR 1794, AND STILL CARRIED ON
WITH A VIEW TO COLLECT, RECORD, AND BRING INTO PUBLIC NOTICE,
THE USEFUL INVENTIONS OF ALL NATIONS.

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July—December, 1839.

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THE

REPERTORY

OF

PATENT INVENTIONS.

No. LXVII. NEW SERIES.—JULY, 1839.

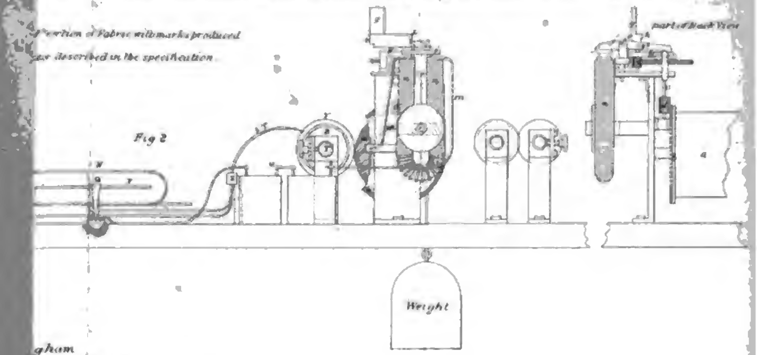
Specification of the Patent granted to EDWARD DAVY, *of Fleet Street, in the City of London, Chemist, for Improvements in Apparatus for Making Telegraphic Communications or Signals by means of Electric Currents, parts of such Apparatus being applicable to Obtaining, Regulating, or Measuring Electric Currents for other Purposes.*—Sealed July 4, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Edward Davy, do hereby declare the nature of my said invention and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention relates to certain improvements in the apparatus to be employed for making telegraphic communications or signals by means of electric currents, parts of such apparatus being applicable to other purposes as hereafter explained.

The principles on which currents of electricity are caused to be transmitted through metallic circuits being well understood, it will not be necessary for me to enter into a general description of such principles, and I would at the outset state that various propositions have been made, and apparatus designed, for employing electric currents, passing through metallic circuits, to the purposes of making communications and signals from one place to another, some of which have been secured by letters patent; I wish it, therefore, to be understood that I make no claim to the general use of electric currents, transmited through metallic circuits, but my invention only relates to certain apparatus employed for such purposes; and in order to give the best information in my power for the carrying out my invention, I will suppose that it is desired to have the means of transmitting communications or signals, by electric currents passing through metallic circuits from London to Birmingham, and to Liverpool, and it will readily be understood that although I have selected these three places, what will hereafter be said of them, will equally apply to any other three places, and I have only selected them for convenience of description; and I will suppose that certain wires have been laid down from London to Liverpool, through Birmingham, such wires being isolated one from another, so that there can be no lateral metallic contact of one wire with the other, and this may be performed in various ways; the one I recommend is, to cut longitudinal slits or grooves by circular saws, or other proper means in lengths of wood joined one to another, and a single wire laid in each groove, and the grooves filled by caulking, in like manner to the seams of ships. At London is to be applied certain apparatus to the wires, which I will first describe. There is also to be a certain other apparatus at Birmingham and Liverpool, which I will next describe, for receiving the signals, signs, or indications. I will then describe certain apparatus, which is to be applied at


Portion of Fabric with marks produced
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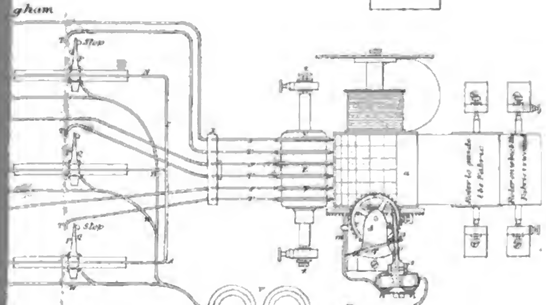
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PATENT

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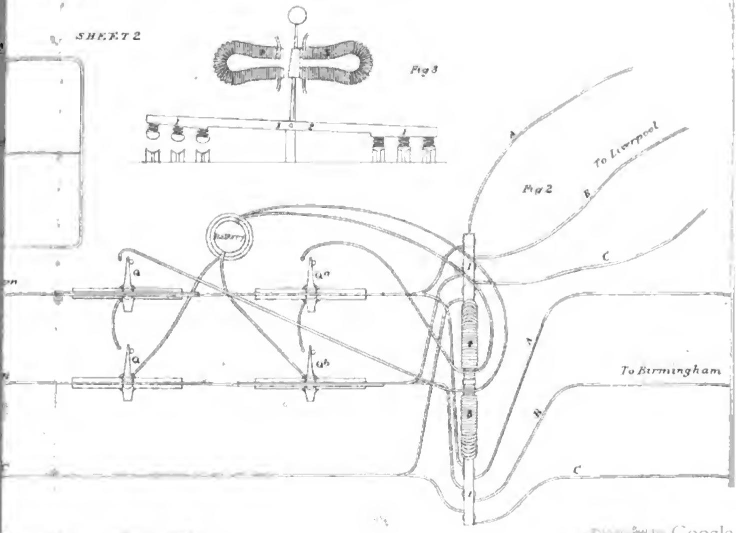

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various intermediate places or distances, in order to renew the electric currents passing through metallic circuits, in such cases, where the place from which the communication is transmitted, is very distant from the place where the communication can be received, in order that the currents passing through the various circuits of wire, notwithstanding the distance of one point to another, that the currents shall be sufficiently powerful throughout to perform with certainty, facility, and quickness. And further, according to my invention, the apparatus can be so arranged, that (although currents of electricity can be transmitted from London to Liverpool, through Birmingham) by the working of the invention, a communication may be made from London to Liverpool, or to Birmingham, without the necessity of making the same communication or signals at Birmingham, and at Liverpool; at the same time the person making the communication at London, can, by the working of the apparatus, so operate, as to determine at which place the communication or signals shall be made. I shall lastly describe such details in the apparatus, as will be used under particular circumstances, and also point out how much, and in what manner, some of the parts are applicable to other purposes.

Description of the Drawing.

The drawing, No. 1, represents the apparatus employed at the place of making a communication or signal, say London, and that at the place where the communication or signals are received, say Birmingham or Liverpool. The wires, A, B, C, are those which are laid down between those two places.

Fig. 1, representing a plan.

Fig. 2, a longitudinal view of the apparatus in elevation; and,

Fig. 3, a front view of the key-board employed, by which the metallic circuits, capable of being obtained by the wires, A, B, C, may be greatly varied, as will be hereafter explained. D, E, F, G, H, and I, are six wooden finger-keys or instruments, which the person desirous of making a communication, depresses in such manner, as to indicate such signs as the apparatus is capable of, at a distance; and according to the order in which these keys are depressed, so will be the varied metallic circuits produced, and, consequently, the varied compounding of the signs the apparatus is made capable of. The finger keys are all similar to each other, and they move on axes at one end, the other end of which being free, to be depressed when required, and each key has a spring and wire, or rod, J, by which the key is at all times pressed upwards out of contact with the metallic surface below, the object of which will be better understood hereafter; the wire (passing freely through the key) having a head or enlargement prevents the key being forced too high by the spring, J, hence, when the keys are not acted on, they retain their horizontal position. On the underside of each of the keys are applied two metallic buttons or surfaces, K, L, they being applied thereto by means of small springs, in order to obtain such a degree of play that when the key is depressed downwards the contact of both may be ensured with respect to the metallic surfaces below. I would here state, that the principle on which this apparatus works is this, that there are two or more wires which communicate with another wire, and, for distinction sake, I will call the two or more wires the signal wires, and the other wire the common communicator, for it should be understood that no metallic circuit can be formed between any two or more of the signal-wires of themselves, and it is only by the aid of the common communicating-wire that a metallic circuit for transmitting electric currents can be obtained with one or more of the signal-wires; and further, whatever be the number of wires employed so having a connection with a common communicating-wire, there is to be a suitable electric apparatus, such as a voltaicbattery to each signal-wire. The drawing shews the apparatus to consist of two signal-wires, A and B, and a common communicating-wire, C; and the drawing further shews the apparatus to have three separate batteries, but this is not essential; the object in using the third, is to obtain a greater extent of signals or indications by the three wires so used, than can be obtained by the employment of only two batteries, which is the number of signal wires employed in this case; but by this means, the common communicating-wire may have needles and suitable apparatus, and become also a means of communicating signals as well as the signal-wires. D, E, are the pair of finger-keys, which cause electric-currents to pass through a circuit, partly made up of the signal-wire, A, and it will be found that the parts are so arranged, that by depressing the key, D, it will bring the signal-wire, A, in metallic communication with the negative pole of the battery, No. 1, and at the same time cause the common communicating-wire, C, to be in metallic communication with the positive pole of the same battery, No. 1; consequently, the electric currents would, by so depressing the key, D, pass positively through the wire, C, and negatively through the wire, A; for it will be seen that the wire, A, is brought into metallic communication with the short wire, A^1, of the negative pole of the battery in the following manner: The wire, A, at its end is turned up at right angles under the button or surface, K, of the key, D; and such is the case with the wire, A^1; it is attached to the negative pole of the battery, No. 1, and is turned up at right angles at the other end, under the surface, K; consequently, on the descent of the button or surface, K, by the pressing on the key, D, it will produce suitable metallic contact and communication to allow of the current passing from the wire, A, through the wire, A^1, to the negative pole of the battery, No. 1; and the positive current is caused to pass from the battery, No. 1, through the wire, C, by means of the short wire, A^2, which is connected with the positive pole of the battery, No. 1; the short wire, A^2, is turned up at right angles under the button or surface, K, of the key, E, and the wire, A^2, is connected with, or soldered to, the short wire, C^1, which is turned up under the button or surface, L, of the key, D; and the end of the wire, C, is also turned up at its end under the button or surface, L. And it will thus be seen, that by depressing the key, D, there will be a metallic circuit completed through the wires, A, C, in the following manner: The positive currents of electricity from the battery, No. 1, will pass through the wire, A^2, through the wire, C^1, through the wire, C, through the signal-wire, A, back to the negative pole of the battery, No. 1, by passing through the short wire, A^1, and the course of the electric currents may be reversed through the wires, A, C, by depressing the key, E, in place of the key, D; for by this means, the button or surface, K, of the key, E, will cause a metallic contact or communication between the short wire, A^2, and the wire, A, and will consequently cause a metallic communication between the wire, A, and the positive pole of the battery, No. 1; and the button or surface, L, of the key, E, will effect a metallic communication between the wire, C, and the negative pole of the battery, No. 1, by means of the short branch-wire, C^3, from the wire, C, the short wire, C^2, being turned up at right angles under the button or surface, L, of the key, E. By this means a complete and suitable metallic circuit is again obtained between the wires, A, C; but in this case the electric currents pass from the positive pole of the battery, No. 1, through the wire, A^2, then through the wire, A, and return to the battery through the wire, C, through the branch wire, C^2, thence through the wire, A^3, to the negative pole of the battery, No. 1, by the short wire, A^1; all which will readily be understood by examining the drawing, No. 1, Figs. 1, 2, and 3, bearing in mind that at the distant place where the wires, A, B, C, terminate, they are at all times in metallic contact. It should be stated, that although the short wires, A_3 and C^1, cross each other, they must be isolated, or kept out of metallic contact, one of the other. There is no metallic circuit formed between the wires, A and C, unless the key, D, or the key, E, is depressed, as above explained, and a metallic circuit will be kept complete between the wires, A and C, so long as either of those keys are depressed, and the positive current will pass through, A, or through, C, as the case may be, and as above explained. The keys, H and I, act on the wires, B and C, and produce metallic circuits, through which electric currents from the battery, No. 2, may be transmitted, in like manner, to what has been described in respect to the wires, A and C, and the battery, No. 1, by the keys, D, E. No further description of the keys, H and I, and their mode of action, will be therefore necessary.

I will now proceed to describe an apparatus for receiving the communications at Birmingham or other place, which apparatus is also shewn at figs. 1 and 2. The wires, A, B, C, just before being connected together, are each made into two coils, or convolutions of the wire, similar to what are employed for galvanometers, in order to give such an effect by the electric currents as to operate with sufficient power on the needles as to cause them to move on their axes in a direction according to that in which the electric current is passing; M, N, shews these coils or convolutions of each of the wires, A, B, C: but in place of having some twenty or more convolutions of each wire, the drawing shews only one turn or convolution to each coil, M, N, which is done in order to shew the needle and working parts more clearly The needles employed consist of magnetized plates of steel, O, P, moving on points similar to magnetic needle, as is shewn in the drawing; and when at rest, and pointing north and south, they are to be in a line with the wire-coils in which they move. To the upper part of each needle is affixed the brass-finger or cross-needle, or contacting-piece, Q, as is shewn, one end of such cross-needle or contacting-piece, being bent down at right angles, till it descends sufficiently low to pass under the bearing of the axis or point on which the needle, O or P, moves, the cross-needle is then bent inwards, and passes under the axis or point, and is again turned down at right angles, where the point enters a small cup of mercury, and the object of so bending the cross-needles or contacting-piece, Q, is, that their points shall work in the same lines as the axes or points on which their needles move, as by that means the lower ends of the cross-needle or contacting-pieces move in the mercury with little friction. R, R, are stops, against which the cross-needles come in contact at times, when not acted on by electric currents. S, T, are wires, against which the cross-needles or contacting-pieces, at times, come in contact, in order to produce metallic circuits, for the purpose of producing marks or indications on chemically-prepared fabrics, as hereinafter explained. V, is a compound battery, from the positive pole of which, a wire, W, communicates with each and all of the cups containing mercury, consequently, when either of the cross-needles is caused to touch the wire, S, or T, there will be a metallic contact or communication from the positive pole of the battery, V, and the wire, S, or T, depending on the course in which electric currents are passing through the circuits, produced by the wires, A, B, C; thus, supposing a positive current to be passing through the wire, A, the cross-needle, or contacting piece, Q, of the needle, O, of the wire, A, would be deflected towards, and come in contact with, the wire, S, and produce a metallic contact or communication between the wire, S, and the positive pole of the battery, V, and on the other hand, if a negative current is passing through the wire, A, the cross-needle, or contacting-piece, Q, of the needle, P, would be brought in contact with the wire, T, the cross-needles or contacting-pieces, Q, of the needles, O, P, are so arranged and operated upon, that when one of them is caused to touch its wire, S or T, the other will be borne away from its wire, S or T, and rest against its stop; thus it will be seen, that each wire, A, B, has a capability of giving two separate indications by their wires, S, T, and these indications may be increased by compounding to eight, according to the order in which those indications are communicated; and such number may be increased by applying needles, O, P, Q, to the wire, C, and applying a third battery, which I have marked No. 3, and two extra keys, F, G, to the key-board; the object of which extra battery, No. 3, will be hereafter described. The pairs of wires, S, T, pass through a block of wood, X, which acts as a support. The ends of such wires, S, T, are forked, and embrace the metallic rings, Y, affixed on the wooden cylinder, Z: the axis of this cylinder turns on points, Z^1. The metallic rings of platina, Y, are kept closely against the cylinder, *a*, which turns in suitable bearings carried by the framing, as shewn in the drawing. *b*, is a cog-wheel affixed on the cylinder, *a*. This cylinder, *a*, has a constant tendency to revolve in one direction, communicated to it by a spring or weighted cord, but is only permitted to turn a certain distance each time that an indication has been made through the wires, A, B, C, and after the hand has been removed from the keys. *c*, is an upright axis, having a pinion, *d*, which takes into, and is driven by, the wheel, *b*, and on the axis, *c*, is affixed the cog-wheel, *e*, which takes into and drives the pinion, *f*, on the axis, *f*; there being on that axis, *f*, a fly-vane, *g*, which has two notches, *h* and *i*. *j*, is a plate of soft iron, which is carried by the lever, j^1, which moves on a horizontal axis, j^2. *k*, is a lever moving on a vertical axis, the lever, *k*, carrying the axis, j^1, consequently the plate, *j*, is capable of receiving an up and down movement on its own axis, and a portion of a rotatory motion on the axis of the lever, *k*. Through the lever, j^1, there is a pin or projection, j^3, against which the end, *h*, of the fly-vane, *g*, is now stopped, and the apparatus is in the position proper for receiving an indication or sign through any of the wires, A, B, C, and such indication or indications will be permanently recorded, as hereafter explained. It should be stated that there is also at times a metallic contact between the negative pole of the battery, V, and the metallic cylinder, *a*, by means of the wire, *m*, which is coiled round a bent bar or horse-shoe of soft iron, in order to produce an electro-magnet, *n*, and from thence the wire, *m*, passes, and is held in contact with the end of the cylinder, *a*, consequently whenever any one or more of the contacting-pieces of the needles, O, P, come in contact with their wires, S or T, a metallic circuit or circuits will be formed; and it will be evident that if properly prepared fabrics, such as calico (impregnated with hydriodate of potass and muriate of lime), be placed between the metallic rings, Y, and the cylinder, *a*, whichever of the rings, Y, are for the time being in the metallic circuit which has been established, will, by its pressing against the cylinder, *a*, pass the current through the prepared fabric, and produce a mark thereon; whilst those rings, Y, which have not electric currents passing through them, will not make any mark on such fabric; consequently on observing the fabric, it will readily be ascertained which and how many of the wires, S, T, have been caused to communicate an indication by electric currents being transmitted through them; and it will only be necessary to assign to each mark so produced or indicated on the fabric a definite cypher referable to a proper key-book, as is well understood in telegraphic communications, in order to obtain a means of rapid communication from one place to another by the aid of electric currents. In establishing a metallic circuit by the wires, A, B, C, and consequently with some or other of the wires, S or T, the electro-magnet, *n*, will attract the plate, *j*, and thus release the end, *h*, of the fly-vane, *g*, and allow it to make a half-revolution, and be again stopped by the pin, j^2, and consequently allow the fabric to be moved forward a short distance by the roller or cylinder, *a*. When the hand of the person making the communication is removed from the key or keys, the contact of the plate, *j*, with the electro-magnet, *n*, will be broken, and the fabric allowed to be moved forward by the cylinder, *a*, a distance equal to that at which the indications should be apart on the fabric for the sake of distinctness. The stud, *l*, in the revolution of the wheel, *e*, coming against a curved surface at the end of the lever, *k*, forces that end of the lever to move towards the centre of the wheel, *e*, and places the pins, j^3, in such a position as to intercept the fly-vane, *g*, and again be in the position shewn in the drawing, consequently these parts act as an escapement, which works by the currents of electricity produced by the person making the communication through the wires, A, B, C. The fabric, as it is carried forward by the cylinder, *a*, is conducted away over a guide-roller, and drawn forward by a weight, or in any other suitable manner. And I would remark, that although I have recommended the use of calico prepared in the manner above stated, as the fabric to be used for receiving the marks, I do not confine myself thereto, as other fabrics may be used, and the chemical materials employed may be varied, so long as they will be similarly marked by the passage or action of electric currents. The fabric so employed may be printed with subdivisions, as is shewn in the drawing, or it may be used plain, because the marks made, whether a single one, or more than one at a time, will be in rows across the fabric; and each row, whatever be the number of marks, will be a communication or signal, and this mode of receiving marks in rows across and lengthwise of the fabric constitutes an important feature in my invention; for although I prefer that the marks should be produced by the chemical action of the electric currents acting on fabrics properly prepared, yet it will be evident that other means of producing a series of marks in rows, crossways, and lengthwise of the fabric, may be resorted to, such as pencils or ink, connected to or carried by proper holders acted on by electro-magnets, one pencil, or other marking instrument, to each wire, S, T; by which means every time a metallic circuit was produced by the aid of any of the wires, S, T, they would cause their electro-magnets to bring the marking-instrument in contact with paper or other suitable fabric, and give marks thereto across such fabric; and as the fabric was moved forward, the next row of marks would be made at a distance from the preceding row, and separated therefrom, the same instrument producing its mark at all times in the same longitudinal row.

I would remark, that I am aware that it has been proposed to use a marking-instrument with lead or ink by the aid of an electro-magnet, to make a number of dots or marks to a moving surface of paper, and by the number of dots that are marked in immediate succession, to indicate the signification of such communication. I do not therefore claim the use of marking-instruments generally, but only when they are adapted to make communications by marks across and lengthwise of the fabric which receives them, as above described.

It has been found that electric currents, in passing through considerable lengths of metallic circuits, decrease in energy, consequently where the point from which the communication or signal is given is very distant from the point or place at which the communication or signal is received, it is necessary to have some means of overcoming this difficulty, and it has been proposed to have a number of apparatus at comparatively short distances, and persons to attend thereto, to receive and transmit the various communications on from place to place (in like manner to what is now done in communicating from place to place by telegraphs depending on sight), till the communications or signals reach the destined place, which is necessarily an expensive means, and attended with greater liability to error in making a communication. Now by my invention I so arrange the metallic circuits that at the requisite intervals the apparatus itself will bring into action a succession of wires, having their own batteries, which I call Renewers; let it be supposed it has been determined that the energy of the currents passed through the wires, A, B, C, will be sufficient for the purposes to which they are applied, for a length of ten miles, and this will readily be ascertained by a galvanometer, which will, by testing the wires at different distances, indicate the extent those wires will transmit electric currents, with the degree of energy which will act on the needles employed, with sufficient correctness and quickness to make or transmit the communications or signals with the degree of velocity desired, and the arrangement is such, that the electric currents which are transmitted from and to the batteries, No. 1, and No. 2, by the wires, A, B, C, do not pass on to the distant place where the communication is to be received, (if that place be too far distant for such electric currents transmitted through, A, B, C, to act with the energy desired,) but further electric currents are obtained, and pass through other metallic circuits, brought into action by the working of the apparatus by the person (say at London) who is transmitting the communication or signal. By this means, the person making the communication or signal, does so direct to the distant place, say from London to Birmingham, without the intervention of other persons, aided only by the requisite apparatus for receiving and transmitting such communication or signals from place to place, until they arrive at the ultimate place desired.

In the drawing, No. 2, fig. 1, is a plan of the apparatus for renewing, which is to be applied at such places or distances as may be determined on. A, B, C, are the ends of the wires before spoken of in respect to the drawing, No. 1, (but it will be seen that their positions have been transposed by error in this drawing,) A^a, B^a, C^a, the three wires through which fresh electric currents are to be transmitted, such fresh currents corresponding in effect with those already described in respect to the wires, A, B, C, the wire, A^a, having a positive or negative current transmitted through it, when there is a positive or negative current transmitted through the wire, A, and so on in respect to the others, and this is accomplished in the following manner; No. 4, No. 5, are two batteries, and O, P, Q, are needles, and their contacting-pieces, such as I have before described, and the cups containing mercury, are connected to the positive and negative poles, thus the wires coloured pink from the cups, connect those cups with the positive poles of the batteries, and the wires coloured green, connect their cups with the negative poles of the batteries, as will readily be understood on examining fig. 1 of the drawing, No. 2. Thus the cups of the needles, O, are connected with the negative poles of the batteries, and the cups of the needles, P, are connected with the positive poles of the batteries; by this arrangement it will be evident that if a positive electric current be passing in the wire, A, it will cause the contacting-needle, Q, to come in contact with a branch projection, or the wire, A^a, and thus produce a metallic connection or communication with the positive pole of the battery, No. 4, and the needle, Q^1, would come in contact with a short branch from the wire, C^a, which would produce a metallic contact with the negative pole of the battery, No. 4; hence a positive electric current would be transmitted through the wire, A^a, and return by the wire, C^a, and if the end of the circuit produced by the wires, A^a, C^a, be not the place at which the communication is to be received, then another circuit will be by a similar means, communicated to another arrangement or relay of wires, till the distance is accomplished, and further, supposing a negative current to be passing through the wire, A, then the contacting needles, Q^2, Q^3, would be brought into action, Q^2, opening a metallic communication with the wire, C^a, and the positive pole of the battery, No. 4, and the contacting-needle, Q^3, would effect a metallic communication between the negative pole of the battery, No. 4, and the wire, A^a, as will readily be traced in this drawing, and a like effect will take place in respect to the wires, B^a, C^a, from and to the battery, No. 5, when electric currents are transmitted through the wires, B, C.

In making communications or signals by means of electric currents, from such a place as London, (from which wires may be laid to various towns, such as Birmingham, Liverpool, Manchester, and many other places,) it becomes desirable that all communications or signals made for one place, should not of necessity be communicated to the whole of the places with which the apparatus is arranged to communicate, but that a signal or communication if for Liverpool, should be delivered only at that place; now, according to my invention, this may be effected with great facility, however many the branches, by means of electric currents acting on suitable apparatus; and the course the communication shall take, can be determined by the person making the communication. Figs. 2, and 3, of drawing, No. 2, shew an arrangement of apparatus suitable for carrying out this part of my invention; in this case similar needles, O, P, and contacting-needles, Q, in coils of wire are employed, in order to determine the course of the signal, these parts are marked with the same letters of reference, the description and mode of working hereafter will readily be understood by again supposing that, A, B, C, are continuations of the same wires as have been before spoken of, at any point between London and the place where the signals or communications are received at Birmingham, these wires are each caused to branch in two directions, one branch of each wire for communicating with Liverpool, and one branch of each wire for communicating with Birmingham, each branch is turned up at right angles, as shewn at fig. 3, in order to come under suitable buttons or metallic surfaces for making contacts with the ends of two wires; each button is similar to what has been described for the finger-keys already explained, and there is for each branch of wire, A, B, C, to be a wire leading to Birmingham and to Liverpool, the ends of such wires being turned up in like manner to the ends of the branches of wires, A, B, C, and coming under the same buttons or surfaces on the balance-bar, (1), which moves on an axis, (2), there being a rod rising from the bar, (1), having a weight at top, and a piece or plate of soft iron, which rests against one or other of the electro-magnets, (3), (4), as will be seen in the drawing, and the contacts are so arranged in the drawing, that the electric currents would be transmitted to Birmingham, and make their communication there; but in case it be desired to change that state of things, and to deliver the communications or signals at Liverpool, in such case, the person making a communication, would pass electric currents through the wires, A, B, positive through, B, and negative through, A; by this means the contacting-needle, Q^b, would come in contact with a branch of the green wire, leading from the cup of, Q^a, which would produce a metallic communication between that cup and the cup of the needle, Q^b, and the electric current through the wire, A, would cause the needle, Q^a, to come in contact with a branch of wire from the electro-magnet, (4), and thus produce a metallic circuit through the wire around that magnet, as the magnets are at all times in contact with the other pole of the battery, the consequence of which would be, that the plate would be drawn from the magnet, (3), to the magnet, (4), and thus produce contact of the wires to Liverpool with one set of the branch-wires of, A, B, C, and at the same time will break off the contact with the wires to Birmingham, and so long as the apparatus remains in this condition, the communications transmitted will be to Liverpool, and it will be evident that by passing currents of electricity through the wires, A, B, in the opposite directions, contacts may be again established with the Birmingham wires by means of the other contacting-needles on the wires, A, B.

Another part of my invention relates to an improved construction of galvanometer, whereby the strength or energy of electric currents may be ascertained, whether it be for the purpose of ascertaining at what distances the apparatus I have called the renewers should be applied, or for measuring the energy of electric currents for other purposes. The apparatus acts on the principle of a scale-beam or of a steelyard.

Figs. 4, and 5, of drawing No. 2, shew an apparatus made according to my invention. *a*, is a coil of wire, similar to what is used in ordinary galvanometers, and, *b*, is a horizontal axis to the needle, *c*, so that the needle will be operated on in such manner as to dip. *d*, is a scale for receiving weights attached to one end of the beam or needle, *c*, and I prefer that the end of the needle, *c*, with the scale, should slightly preponderate over the other end of the needle. And *f*, is an upright on to which the other end of the needle is drawn, by the force of the electric currents. In using this apparatus, negative and positive wires are to be connected with the ends of the wire of the coil, *a*, and electric currents passed through, and the strength of the currents will be ascertained by the weight it will overcome in the scale.

Having thus described the nature of my invention, I would have it understood, that although I have mentioned three wires, A, B, acting with C, yet it will be evident that this number may be varied according to the requirements of the places between which the wires are laid; the number of wires used depending on the intricacy of communications likely to be made; thus, three wires, A, B, and, C, with two batteries, Nos. 1, and 2, will produce eight different signals, signs, or indications, and by using a third battery, No. 3, and having needles applied to the common communicating-wire, C, twelve different signals, indications, or signs may be transmitted, the object in using a third battery in such case, being to give greater quantity of electricity to certain currents; thus, supposing a positive electric current to be passing through the wire, A, and a negative electric current to be passing through the wire, B, there would be two electric currents passing to the wire, C, in opposite directions, consequently the needles on the wire, C, would not be acted on in such manner as to obtain a certain and definite indication or signal by the needles of such wire, unless the positive or negative current passing to the wire, C, in opposite directions, be made more powerful than the other, and this may readily be effected by the keys, F, G, which can bring the wires, A, C, B, C, in connection, or metallic communication with the battery, No. 3, in addition to their own battery, and thus give more power to one of the currents passing through the wire, c, in one direction, than the current coming in the other direction.

And I would remark, that although I have shewn particular instruments for making and breaking metallic circuits for regulating the place to which communications shall be made, (in an apparatus arranged suitably for communicating with many places,) yet I do not confine myself thereto, so long as the apparatus is suitably arranged to enable the person making the communication by means of electric currents, to determine and regulate the place to which the communications or signals shall be transmitted. And in respect of the means of transmitting communications or signals through metallic circuits to distant places, (too far distant for a single circuit to transmit electric currents with sufficient effect,) and which may be said to be the employment of relays of metallic circuits, and electric currents however obtained, the apparatus or instruments may be varied, without departing from my invention; my invention not depending on the instruments, but in the so arranging metallic circuits, that they can be brought into action in the manner above described. It will be desirable to observe, that although I have shewn and described the various parts of the apparatus to be worked by only one mode of obtaining metallic circuits, by two or more wires working with one common communicating-wire, it will be evident that some of the parts of my invention may be used with other means of obtaining metallic circuits. I do not therefore confine myself to the employment of all the improvements herein described in the same apparatus, nor do I confine myself to the mode of receiving signals or communications from the other parts of the apparatus, as arranged and combined according to my invention, as other modes may be resorted to if desired, and in other respects retain much of the utility of the other parts of the invention. And I would have it understood, that I lay no claim to the separate parts of the apparatus shewn and described, when uncombined, and not used as above described. And I recommend the use of compound-batteries in all cases where batteries are used, and I have only shewn single ones to simplify the drawing, and in using electro-magnets for any purpose of telegraphic communication as herein explained, there should not be positive contact of the soft iron with the ends of the magnets, but a portion of their leather or other material should be interposed. It will be evident that the apparatus employed by me, and described above, for varying the directions of electric currents from one set of wires to another set of wires, may be used generally, where electric currents are desired to be obtained, and their course regulated by the apparatus itself, are required; and such is the case in respect to the apparatus or galvanometer for measuring the strength of electric currents; and further, the apparatus described for producing an escapement will be applicable for most purposes where a like description of escapement is required in making communications or signals for telegraphic purposes. And I would have it understood that what I claim as my invention is:—First, the mode of obtaining suitable metallic circuits for transmitting communications or signals by electric currents, by means of two or more wires, which I have called signal-wires, communicating with a common communicating-wire, and each of the signal-wires having a separate battery, and, if desired, additional batteries, for giving a preponderance of electric currents through the common communicating-wire, as above described.

Secondly, I claim the employment of suitably prepared fabrics for receiving marks by the action of electric currents for recording telegraphic signals, signs, or communications, whether the same be used with the apparatus above described or otherwise.

Thirdly, I claim the mode of receiving signs or marks in rows across and lengthwise of the fabric, as herein described.

Fourthly, I claim the mode of making telegraphic signals or communications from one distant place to another, by the employment of relays of metallic circuits, brought into operation by electric currents.

Fifthly, the adapting and arranging of metallic circuits in making telegraphic communications or signals, by electric currents, in such manner, that the person making the communication, shall by electric currents and suitable apparatus, regulate or determine the place to which the signals or communications shall be conveyed.

Sixthly, I claim the mode of constructing the apparatus which I have called the escapement, whether it be applied in the manner shewn, or for other purposes, where electric currents are used for communicating from one place to another.

Seventhly, I claim the mode of constructing the galvanometer herein described.

And lastly, I claim such parts as I have herein pointed out, as being useful for other purposes, as above described. —In witness whereof, &c.

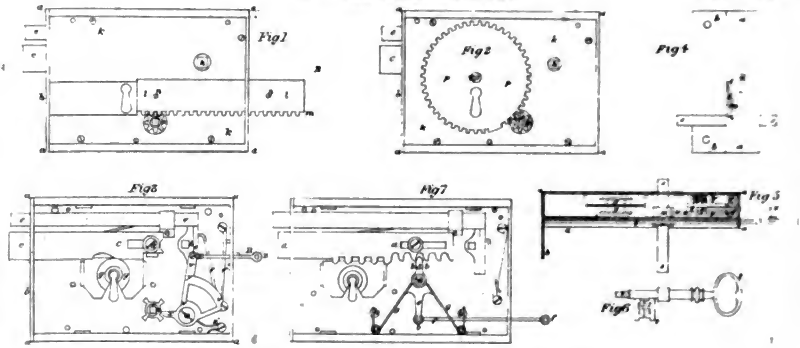
Enrolled January 4, 1839.

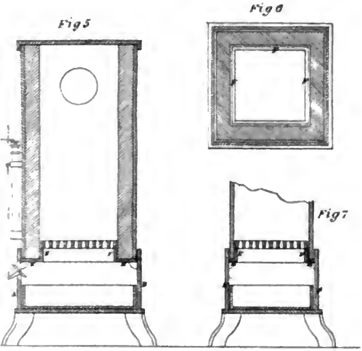
Specification of the Patent granted to SALLY THOMPSON, *of Upper North Place, Gray's Inn Road, for certain Additions to Locks or Fastenings for Doors of Buildings and of Cabinets, and for Drawers, Chests, or other Receptacles, for the Purpose of Affording greater Security against Intrusion by means of Keys Improperly Obtained.*—Sealed November 13, 1838.

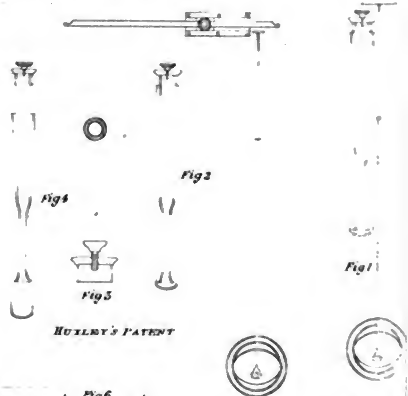
WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Sally Thompson, do hereby declare that my said invention, and the manner in which the same is to be carried into effect, are set forth and explained in the

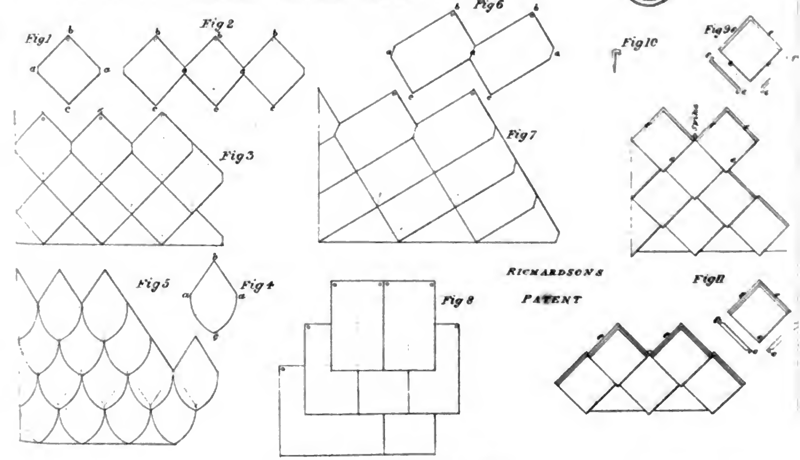
MRS SALLY THOMPSON'S PATENT.







HUXLEY'S PATENT



RICHARDSON'S PATENT

LONDON Hodson 112 Fleet St July 1 1839

following description thereof, reference being had to the drawings hereunto annexed, and to the figures and letters thereon marked, in correspondence with the figures and letters herein contained (that is to say):—

My invention is applicable to the setting in motion of an alarum before any key can be introduced into the lock or fastening, or before the bolt can be withdrawn; and I accomplish this object, firstly, by placing before the key-hole of the lock or fastening a plate, forming a shutter to the key-hole, to be removed by being slidden away, or being turned on an axis before the key can be introduced into the lock, which shutter shall be in communication with an alarum produced by the vibration of a bell, or other sonorous body, situated either within the lock, or contiguous to it, or in a room or place to which the motion may be conveyed. And secondly, by forming a communication from the bolt of a lock to a sounding body, so that the motion of the bolt in being withdrawn shall cause a sound, or a succession of sounds, to be given at such place within practicable distance, as the proprietor of the lock shall determine upon. These the principles of my invention admit of being carried into effect according to the local and other circumstances, in a great variety of forms and modifications, of which those shewn in the drawings, and hereinafter described, are given as samples, and afford sufficient information to any competent locksmith to enable him to carry the invention into effect as variously formed as he pleases, and in as beneficial a manner as I myself can perform the same.

Description of the Drawings.

Fig. 1, a view of the inner side of a lock, with the addition of a sliding-shutter, to cover the key-hole at pleasure, as seen when complete, and ready to be screwed on to a door.

Fig. 2, the inner side of a similar lock, but with a revolving-shutter.

Fig. 3, the appearance of the works in the interior of the lock when the shutter, and the plate upon which the shutter slides or revolves, are removed.

Fig. 4, a view of the back end of the lock (figs. 1 and 3), with the spindle and return-plate, as seen beyond the end.

Fig. 5, a horizontal section from A to B of figs. 1 and 3, with the bolt removed to allow the works below the section to be more distinctly represented.

Fig. 6, the key of the lock, with a prolongation for turning the spindle carrying the pinions which move the shutter, and communicate motion to the sounding body. The same letters of reference signify the same parts in all the figures. *a*, the frame or case to which the works are affixed. *b*, the return-plate at the front end of the lock, which is let in and screwed to the front edge of the door. *c*, the ordinary bolt of the lock. *d*, a screw fixed in the frame of the lock, upon which a slot in the bolt slides. *e*, the ordinary sliding spring-latch. *f*, the spring and lever to throw out the latch. *g*, the ordinary system of wards. *h*, the double lever for sliding back the latch, having the usual square latch to receive the stem of the handles. *k*, the inner plate, commonly called the cap-plate, inclosing the works of the lock. *l*, the sliding-shutter, having a toothed-rack formed along the under edge, extending nearly from end to end. *m*, a dovetailed piece sliding in a groove sunk in the plate, *k*, to which dovetailed piece the sliding-shutter is secured by two screws. *n*, the two screws holding the sliding-shutter to the dovetailed piece. *p*, the revolving-shutter, having teeth nearly all around its periphery. *q*, a stud fixed in the plate, *k*, upon which the revolving-shutter turns. *r*, a toothed pinion by which the sliding-shutter is moved longitudinally, or the revolving-shutter turned on its axis; *s*, a spindle turning in the outer plate of the case, *a*, and inner or cap-plate, *k*, having an aperture in each end, of a square figure, into which the prolongation of the key is made to fit, this aperture may be of a triangular or other shape at pleasure. *t*, the ordinary key, having a prolongation of the stem to fit the aperture of the spindle, *s*, and by it to turn the pinions which move the shutters and apparatus for communicating motion to the alarum. t^1, the prolongation. *u*, a pinion fixed on the spindle, *s*, inside the plate, *k*, for moving a bent lever or crank, *v*. *v*, the bent lever or crank. *w*, the fulcrum of the crank. *x*, the short arm of the lever for receiving motion from the pinion, *u*. *y*, the long arm of the lever for communicating motion to the alarum. *z*, a link hinged to the long arm, *y*, to lead towards the alarum. z^1, a box containing a spiral spring, represented by dotted lines in fig. 3, which spring returns the crank to its stationary situation, as shewn in the drawings, after the pinion, *u*, has moved the crank to the left. This spring is of the same construction as those used for the closing of candle-snuffers. z^2, a spring for returning the crank to its stationary situation, after the pinion, *u*, has moved it to the right.

Fig. 7, represents a door-lock, in which the communication with the alarum is made from the main bolt instead of from a pinion, in which case the shutter is dispensed with. *a*, the main bolt, having four throws and four ratchet-teeth to move the lever and ring the bell at every turn of the key. It this case it will be advisable to make the key with a short bit, in order that there may be the more power to ring the bell. *b*, the lever, which is here represented straight, except as to two shoulders against which the springs act. *c*, the fulcrum of the lever. *d*, the short arm moved by the ratchet-teeth of the bolt. *e*, the long arm giving longitudinal motion to the link, *f*. *f*, the link to lead the motion towards the alarum. *g*, two springs counteracting each other, to hold the lever stationary when not turned aside by the ratchet-teeth. *h*, two studs for abutments to the springs. It is obvious that the lever may be made either straight or at such an angle as the direction of the alarum shall require.

And I hereby further declare, that I contemplate the application of my invention to the forming of a communication in the manner hereinbefore shewn, from all the locks in the business rooms of a banker, merchant, or other party, with one alarum, or with several separate bells placed in the bed room of the confidential resident, the modes of forming such communications are too familiar with locksmiths and bell-hangers to need any description.

It will be quite unnecessary to shew the application of my invention to a door-latch, a drawer-lock, a chest-lock, a cupboard-lock, a cabinet-lock, or any other lock, as variations will have to be made in respect to form, size, and localities, the principles remaining the same as before described.

And I hereby further declare that I do not claim as my invention those common parts of a lock, shewn at *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, and *k*, figs. 1, 2, 3, 4 and 5, such parts being placed in the drawings merely to elucidate my invention, and distinguish the relative situations of the new and of the old parts. But I do claim the application before the key-hole of a lock or fastening, of a covering-plate or shutter in communication with an alarum, so arranged that the shutter cannot be removed from before the key-hole without the alarum being at the same time sounded either in the lock or contiguous to it, or at any practicable distance, at the pleasure of the proprietor. And I do claim the means of communicating motion from the bolt of a lock or fastening to an alarum placed in any convenient situation, as hereinbefore particularly shewn and described.—In witness whereof, &c.

Enrolled May 13, 1839.

Specification of a Patent granted to JOHN EARLE HUXLEY, *of Marlborough Street*, JOHN EARLE HUXLEY, JUN., *of the same place, and* JOHN OLIVER, *of Dean Street, all in the County of Middlesex, for Improvements in certain descriptions of Stoves.*—Sealed August 31, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, We, the said John Earle Huxley, John Earle Huxley, Jun., and John Oliver, do hereby declare the nature of our invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

Our invention relates to such description of stoves as are provided with means of regulating the degree of combustion, and our invention consists,—

First, of apparatus for regulating the temperature or quantity of combustion which shall go on in the stoves to which such apparatus may be applied.

And our invention, secondly, consists of certain modes of constructing the fire-box and ash-box of such stoves; and in order to give the best information in our power we will describe the drawing hereunto annexed.

Description of the Drawing.

Fig. 1, and 2, represent tubes of glass, iron, or other suitable material, with one end open and the other closed, the upper end of the inner tube is closed with a metal cap, having a screw valve passing through it, for the purpose of admitting air when required, see fig. 3, and the other end is reduced in diameter, as shewn in the drawings, about one-third of its length. The tubes may be of any suitable dimensions, but we consider the most convenient size to be as follows,—the outer tube about twelve inches long and one inch diameter. The outer tube is supplied to about one-fourth of its depth, with quicksilver, oil, or other suitable fluid, but quicksilver we consider best for the purpose. The inner tube being inverted into the quicksilver, and the screw-valve opened to admit air, will sink to the bottom of the outer tube, when the valve being srcewed down quite close, the regulator will be fit for use. The regnlator may be fixed either inside or outside of the stove. When the stove is heated, the air confined by the quicksilver in the inverted tube, will expand, and, by its expansive force, will lift the tube, more or less, in proportion to the degree of heat which may be communicated to it, as shewn in fig. 4, and may thereby be made to open and shut a valve or air passage, by means of levers or connecting-rods, as shewn at fig. 1, and 2. The apparatus fig. 1, acting directly to the connecting-rod of the valve, and the apparatus, fig. 2, acting through the intervention of a lever, by which greater capability and nicety of regulation is obtained.

We would remark that we do not confine ourselves to any particular construction of stove, so long as they are suitably arranged for regulating the combustion by opening and closing air ways, this part of our invention not relating to the construction of the stoves, but to the apparatus employed for regulating the extent of combustion.

Another improvement is in the construction of the fire-box and ash-box of such stoves, by which the undue admission of air is prevented, between the brick lining and the iron case of the fire-box, and by which the construction is simplified.

Fig. 5, is a vertical section of a stove having this part of our invention applied thereto.

Fig. 6, is a plan in section of a similar stove.

Fig. 7, is a section of part of a stove in elevation; in this case the fire-box is of iron, and is not lined with fire brick, as is the case in figs. 5, and 6. A, B, is a quadrangular box of iron, open at the top. E, is a loose plate fitted into box, A, B, resting upon steps about two inches below the top edge. In this plate, E, is an opening of suitable size with a rim, F, about two inches deep, which rim forms a support for the fire-bars at the bottom of the fire-box. Upon the plate, E, between the rim of the opening, F, and the side of the box, A, B, cement is to be placed, upon which the fire-box, formed either of brick, stone, or iron, is to be bedded, which may be easily renewed at any time when burnt out. The box, A, B, may be cylindrical or of any other required form, and will of course have the usual openings for the admission of air, also for removing the ashes.

Having thus described the nature of our invention, we would remark that what we claim is, first, the mode of constructing the apparatus for regulating the combustion of stoves herein described. Secondly, we claim the mode of combining the fire-box and ash-box, as shewn at figs. 5, 6, and 7.—In witness whereof, &c.

Enrolled February 28, 1839.

Specification of the Patent granted to JOHN RICHARDSON, *of Hutton, in the Parish of Rudley, in the County of York, Painter and Glazier, for certain Improvements in the Method of Covering Buildings.*—Sealed January 4, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Richardson, do hereby declare the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention relates to improvements in laying slates, tiles, and other surfaces, in the coverings to buildings, and shaping or forming of tiles and other surfaces, whereby less materials will for like purposes be used, and greater lightness and other advantages will be obtained.

Description of the Drawing.

Fig. 1, represents a square slate, having the two angles, *a*, *a*, removed, this is to be the figure of the slates employed for carrying out one of my improvements.

Fig. 2, shews a row of such slates combined, the edges, *a*, *a*, coming together. *b*, is the upper, and, *c*, the lower angle; hence it will be seen that in laying the next row of slates above those shewn in fig. 1, the lower angle, *c*, will come below the portion or joint, *a*, *a*, and close the same water-tight, as will readily be seen in fig. 3; which shews a roof or surface covered with slates.

Fig. 4, shews another shape or figure of slate, the lower portion thereof being rounded; hence when a number are laid and fastened on a building, they will have the appearance of fig. 5, which represents the covering of a house, the dotted lines clearly indicating the quantity of overlapping of the slates.

Fig. 6, shews an oblong slate, the angles, *a*, *a*, being removed in like manner to fig. 1. These slates are to be fixed angularly on a roof, as is shewn at fig. 7.

I would here remark, that each of these plans are on the same principle, and differ only in the figures of the slates employed, and it will be seen that in such arrangement there is but little overlapping, at the same time, the joints are equally water-tight, as if laid one over the other, and every point of the surface of a roof had at least two thicknesses of slate, and in some part three thicknesses, as is the practice of laying slates and plain tiles, now practised, and as is shewn at fig. 8; but according to the means above described, there will be but one thickness over the larger portion of the area, or surface covered, and the portion of the surfaces where the slates overlap, will be comparatively small, hence greater lightness will be obtained, and a material saving of slates.

And I will further remark, in respect to this part of my invention, that although I have only mentioned slates as the material employed, it will be evident that tiles and other plain surfaces may be employed, when made and shaped as above explained; my invention not relating to the material used, but to the mode of laying the same in covering buildings as above described.

Fig. 9, shews a tile of a peculiar construction, having the sides thereof turned over, in order the better to fix and lay the same; it will be seen that the two sides, *e*, *e*, are turned down, producing a projecting-ridge on the under side, of about one quarter of an inch, and the two sides, *f*, *f*, are turned up, and producing a like ridge on the upper surface, which in making will readily be performed by the workman placing a sheet of clay between two flat square surfaces, and turning down the edges; hence it will be evident that if a row of tiles similar to fig. 9, be laid and affixed on a roof, and this will be conveniently performed by spikes, similar to that shewn at fig. 10; on laying the next row of tiles of a similar construction above those at fig. 10, the ridges, *e*, *e*, of such next row of tiles will lap over the ridges, *f*, *f*, of the row, fig. 9.

Fig. 11, shews another tile, or other flat surfaces having grooves, *f*, *f*, and, *e*, *e*, which answer in place of the projecting-ridges shewn in fig. 9, these will readily be formed by pressing a sheet of clay between two moulds of like figure to two tiles.

Having thus explained the nature of my invention, and the manner of applying the same, I would have it understood, that what I claim as the improvements are the modes herein described of covering buildings with slates, tiles, and other surfaces placed angularly, as described in figs. 1, 2, 3, 4, 5, 6 and 7.

And also the mode of forming tiles or other surfaces as explained in figs. 9, and 11, for the covering of buildings. —In witness whereof, &c.

Enrolled March 3, 1838.

Specification of the Patent granted to HENRY MEYER, *of No.* 126, *Piccadilly, Wax Chandler and Oil Merchant, for Improvements in the Manufacture of Lamps.*—Sealed October 17, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c., *Now know ye*, that in compliance with the said proviso, I, the said Henry Meyer, do hereby declare the nature of the invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

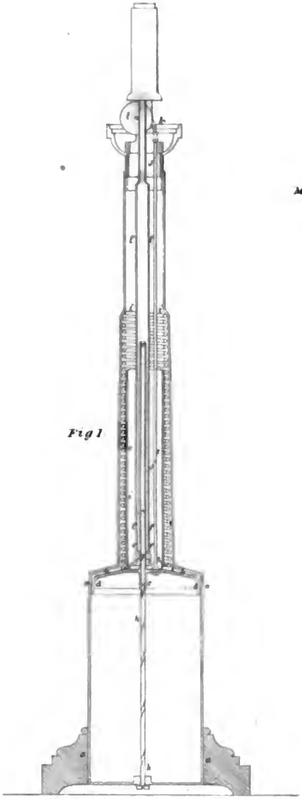
The invention relates to two modes of regulating the flow of oil to the wick; and secondly, to a mode of regulating the wick; and in order to give the best information in my power, I will proceed to describe the drawing hereunto annexed.

Description of the Drawings.

Fig. 1, represents the section of so much of a table-lamp as will enable me fully to describe the invention. *a*, *a*, is the pedestal and pillar of the lamp, the lower part acting as a reservoir to contain oil, and I prefer it to be of a cylindrical figure on the inside, in order to allow of a piston, *b*, to move freely up and down. The piston, *b*, is formed of two plates, which are affixed by soldering, or otherwise, to the tube, *c*. Between the two plates which form the piston is placed a circular sheet or disc of leather, or other suitable material, the edges of which are turned downwards, as is shewn at *d*, *d*, there being a

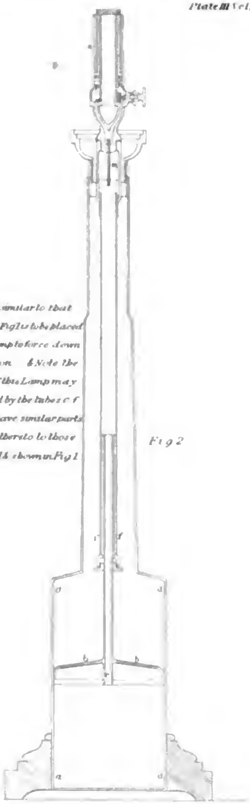
MEYER'S PATENT

Fig 1



Note a Spring similar to that
shown at Fig1 is to be placed
in this Lamp to force down
the Piston & Note the
piston of this Lamp may
be raised by the tubes c f
or may have similar parts
applied thereto to those
described & shown in Fig 1

Fig 2



REE'S PATENT

Fig1

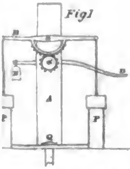


Fig5

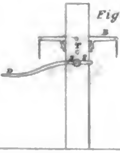


Fig2

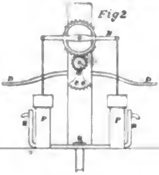


Fig3

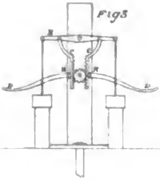


Fig4

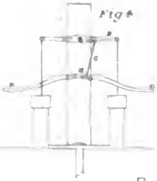


Fig6

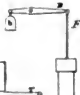


Fig7

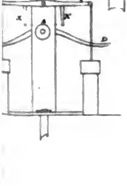


Fig8

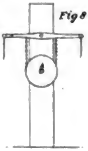


Fig9

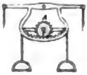


Fig10

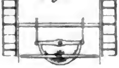


Fig11

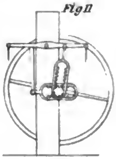


Fig12

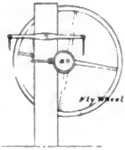
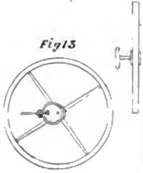


Fig13



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space all round the plates, *b*, of the piston and the inside of the oil reservoir, *a*, consequently when the piston is being raised, any oil which may be above the piston will flow down below the piston, and when the piston is pressed downwards, the rim or circular edges, *d*, *d*, will be forced outwards, and prevent the oil passing upwards; it will therefore find vent in another direction, as hereafter explained. *e*, *e*, is a cylinder or tube affixed to the upper part of the piston, *b*. The object of this cylinder or tube, *e*, *e*, is to keep the spring, *i*, in its place, though this is not absolutely necessary. The tube, *c*, slides within another tube, *f*, affixed in the stem or pillar of the lamp; and it is by the tube, *f*, that the oil is conveyed to the burner, as will readily be understood on examining the drawings; and it will be seen that there is a stuffing-box at *g*, in order to render the junction of the tubes, *c* and *f*, fluid tight, yet allow of the tube, *c*, sliding freely in the tube, *f*. At the lower part of the tube, *c*, the diameter is reduced so as closely to embrace the rod, *h*. This rod, together with the contracted opening into the tube, *c*, by their peculiar construction and combination serve to regulate the flow of the oil to the burner. The rod, *h*, is screwed through the bottom of the oil-chamber, *a*, there being a washer of leather, or other suitable material, to make the joint fluid tight, as is shewn in the drawing. By this arrangement the rod can be readily removed and cleansed, in the event of the oil-duct or passage becoming clogged or obstructed. Around the rod, *h*, is a groove from the top to the bottom, passing in a spiral direction, and the size of the groove is smallest at the upper part, gradually increasing in dimensions as the groove proceeds downwards, the object of which is, that as the spring, *i*, which presses down the piston, gradually decreases in elastic force, 'it is compensated for by a gradually increasing opening for the passage of the oil; for it will be evident that as the progressively increasing size of the groove comes to the lower part of the tube, *c*, the opening for the flow or passage of the oil will gradually increase, and hence the same quantity of oil may be forced up in a given time by a decreasing power, and which is well known will be the result of the progressive expansion of the spring. It will be evident that as the piston descends the tube, *c*, will be drawn out of the tube, *f*, and the tube, *c*, will progressively contain more and more of the rod, *h*, till the piston arrives at the end of its stroke downwards, at which time nearly the whole of the rod, *h*, will be contained in the tube, *c*, consequently the rod, *h*, progressively occupies an increasing space as the piston descends; at the same time, owing to the continually increasing size of the groove formed in the rod, *h*, the duct or opening through which the oil is caused to flow will progressively increase; and it will evidently depend on the dimensions of such groove what quantity of oil will be forced up to the burner in a given time, and the maker may adjust that quantity according to the object he is desirous of obtaining.

I would here remark, that although I prefer that the groove should pass spirally around the rod, as it offers a greater capability of adjustment, owing to the extended length of groove which is thereby obtained in a given length of rod, yet it will be evident that a similar result may be obtained by having a straight groove in the rod, or the groove may be wholly dispensed with, by having the rod tapering, the larger diameter being at the top, and gradually decreasing to the bottom. My invention does not therefore depend on the mode of forming the surface of the rod, *h*, but in its being fixed to the lower part of the oil-vessel or reservoir, *a*, and in such manner that in the descent of the piston, the tube through the piston will progressively contain more and more of the rod, and have more space occupied thereby, and yet at the same time cause the opening or duct into the tube, *c*, to increase in dimensions. *j*, is a rod affixed to the piston. *k*, a short chain affixed to the upper part of the rod, *j*, the other end of the chain, *k*, being affixed to the barrel, *l*, which is mounted on a suitable axis, having bearings at the upper part of the lamp, one end of the axis being squared to receive a key, or it may have a knob permanently affixed thereto, by which the piston may be wound up to its highest position, and being wound up, allow the oil, which is poured into the pillar from above, to flow below the piston, and it will be seen that the overflow oil from the burner will flow down again above the piston.

I will now proceed to describe the second part of my invention, which relates to a lamp similarly constructed to that shewn at fig. 1, but having a different arrangement of regulation.

Fig. 2, shews a section of a lamp constructed according to this part of my invention. *m*, is a regulator, and consists of a small tube, up which the oil is driven, in order to supply the wick by the descent of the piston; and *n*, is a portion of fine wire-cloth, which prevents any impurities being driven up to interfere with the free passage of the oil. The length of this tube may be varied, and, in comparison with its inner diameter, will more or less diminish the speed at which the oil will be caused to flow, a longer (small or capilliary) tube retarding the flow in proportion to its length than a shorter tube of a like diameter; and it should be remarked, that the length should be such that at the commencement of the descent of the piston, the quantity of oil supplied shall be greater than required, or that will be consumed, consequently, the extra quantity will therefore fall on to the upper surface of the piston, and aid the spring to press it down. It will be seen that the parts are put together conveniently for unscrewing to allow of cleaning the capilliary tube, if necessary.

Fig. 2, also shews the third part of my invention. *n*, is the outer tube of the burner; *o*, the wick-holder; and *p*, is the inner tube, having the spiral groove formed in it, heretofore used; but in former lamps this spiral-groove was a fixture, and the wick-holder was caused to rise by being revolved; but according to this part of my invention, I apply a toothed-wheel to the tube, *p*, and by means of pinion, *q*, and handle, I cause the tube, *q*, to turn; and there being a vertical groove formed in the tube, *n*, into which a projecting stud on the wick-holder enters, the revolution of the tube, *p*, will cause the wick-holder to rise vertically and without turning round. And I would only remark in respect of this part of my invention, that this mode of raising the wick may be used to Argand burners, when other modes of supplying oil thereto are employed than those above described.

Having thus described the nature of my invention, I would remark, that I am aware that various arrangements of lamps have before been made, or proposed to be made, having pistons, springs, and tubes, in many respects similar to those above described; and some of them have been secured by patent; and such lamps have had various means of regulating the flow of oil to the burners, such regulators being contained in the tube, up which the oil flows; and cylindrical and tapering rods have before been used, or recommended to be used, in the tubes of table-lamps, up which the oil flows to the burners, in such manner that when the pistons are raised to their highest position, the rods occupy the largest quantity of space in such tubes, and consequently, by the friction of the narrow surface the oil is retarded; and as the pistons descend, such regulating rods progressively occupy decreasing spaces in the tubes. I do not, therefore, make any claim to such parts or their combination, when uncombined according to the improvements as herein described, and such parts may be varied so long as the character of my invention be retained. But what I claim as the improvements secured by the present letters patent, is the mode of applying the rod, *h*, at the lower part of the oil-vessel or reservoir, *a*, and in such manner that in the descent of the piston the rod, *h*, is progressively received more and more into the tube, up which the oil flows, and therefore occupies an increasing space therein, and at the same time causing the dimensions of the duct or oilway into such tube to be progressively increased, as above described.

Secondly, I claim the mode of applying the small tube in combination with the piston, as herein described; and,

Thirdly, I claim the mode of raising and regulating the wick, as above described.—In witness whereof, &c.

Enrolled April 17, 1839.

Specification of the Patent granted to JOHN HUGHES REES, *of Penymaes, near Llanelly, in the County of Carmarthen, Esquire, for certain Improvements in Machinery, applicable to the Raising of Water for Propelling Boats, Carriages, and other Machinery.*— Sealed September 27, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.— *Now know ye*, that in compliance with the said proviso, I, the said John Hughes Rees, do hereby declare the nature of the said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):

Description of the Drawing.

Fig 1. B, is a transverse bar, three feet in length, with a rack nine inches deep. C, is a pinion two inches and a half, from axis to pitch-line of cogs. D, is a handle or lever thirty-six inches long. A, is the standard, five feet six inches, or six feet, long, ten or twelve inches wide, by three or four inches deep. E, is a weight to assist in the upstroke. P, P, are two pumps, (one man will work two

of four inches diameter twenty feet lift), or one of six inches diameter at the same depth. Q, is a bonnet upon the top of the suction-pipe to admit of its being cleared by a rod, if choked.

Fig. 2. B, is the transverse bar. The rack is a complete circle, so that in case the cogs break or wear on one side the other may be turned for use. C, is a pinion of five inches diameter. D, is a double lever for two men, six feet long. P, P, are pumps six inches in diameter. R, R, are pipes fixed just under the lower valve of the pumps. P, P, for the back water (caused by the descent of the piston) to rise through. They have a slide, as shewn. These pipes, R, R, are not essential. C, C, is a pinion of ten inches diameter, hung on another hole, to be used in case a longer stroke is required. A man can make a stroke of twelve inches.

Fig. 3. B, is the transverse bar. G, G, are upright racks with curved ends to meet the transverse bar, with ten or twelve teeth. R, R, are friction-collars two or three inches diameter.

Fig. 4. G, is a connecting-rod affixed to the bars, B and H, the lever-bar, which is so curved as to admit of this rod being fixed at either of the holes to increase the stroke. D, D, is a double lever with a cross-handle, for two, four, or eight men.

Fig. 5, is a back view of fig. 1. T, is a small hole to oil the spindle of pinion. S, S, are sockets for one or two levers to be fixed in.

Fig. 6. *b*, is a weight to be put on the end of the transverse bar, B, when necessary to balance the weight of water on the other side.

Figs. 7 and 8, shew other arrangements, with chains in lieu of cogs for communicating motion to pumps.

Fig. 9, shews the mode of working by the feet. C, is the pinion placed inside the racks, taking less space.

Fig. 10, shews the rack, &c., placed horizontally with long lever, and two men on opposite sides as rowing.

Fig. 11, (for giving a rotary motion), shews that when the pinion quits the teeth of the upper rack, it catches in those of the lower one. The fly-wheel is affixed to the spindle of the pinion, and can turn either way.

Fig. 12, shews the transverse bar and the long arm united in one piece. *u*, is the eccentric-wheel, which acts laterally upon a strap, with a band attached to the lower arm.

Fig. 13, is a side view of the fly-wheel, to the spindle of which is fixed an eccentric-wheel, *a*, of the diameter required. An iron band goes from the connecting-rod round this wheel, *a*, to prevent the jar; brass is let into the circumference of the eccentric-wheel to lessen the friction.

In fig. 7, chains are substituted for cogs. T, is the transverse bar, three feet long. *x*, *x*, are arms united with it, nine inches long, with holes to receive the rod at the end of the chains: the rod has a worm at the end to admit of the chains being tightened with a nut. A, is a wheel of five inches diameter, with a double groove in the circumference to receive the chains and allow them to work clear of each other. This wheel is set below the lower end of the arms, so that when it works, the chains may have an equal strain. The spindle is fixed in the wheel, and the lever acts upon the reverse end of it. Fig. 11, has a pinion with teeth round a part of the circumference only, set between two circular racks; the teeth are so arranged, that when they quit the teeth of the upper rack, they catch in those of the lower one. A fly-wheel is fixed on the spindle of the pinion. The object of this invention as applied to pumps is to obtain a more perpendicular stroke with the piston-rod than is effected with the common lever or brake (thereby saving friction and loss of stroke); and to exert the necessary power in a smaller compass than usual. It is recommended that the transverse bar or arm to which the piston-rod is fixed, be not less than eighteen inches long from its axis; but the other parts may be made of any proportions to suit the stroke required and weight to be raised. The racks may be made of cast or wrought iron (case hardened as being more durable), or brass, or other fitting metal. The standard may be of wood or iron; if in a vessel, the "mast" may answer the purpose.—In witness whereof, &c.

Enrolled March 27, 1839.

Specification of the Patent granted to John Wilson, *of Liverpool, in the County of Lancaster, Lecturer on Chemistry, for certain Improvements in the Process of Manufacturing Alkali from Common Salt.*— Sealed November 22, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Wilson, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, is particularly described and ascertained by the following description thereof (that is to say):—

In the usual method of decomposing common salt by pouring sulphuric-acid upon the salt, muriatic-acid gas is disengaged in great quantity, and is with difficulty condensed on a large scale, and the sulphate of soda produced by this process contains an excess of sulphuric-acid, which is expelled by wasting. Now the objects of my improvements are the following:

Firstly, to effect the decomposition of common salt without the disengagement of muriatic-acid gas.

Secondly, to obtain a neutral sulphate of soda without the loss of sulphuric-acid.

Thirdly, to recover the sulphur in the form of sulphuretted hydrogen when the sulphate of soda is decomposed to procure alkali. These my improvements are effected by the use of certain sulphates for decomposing common salt, viz. the proto-sulphate of iron, the proto-sulphate of manganese, the sulphate of magnesia, and the sulphate of lime. My improvements are also in part effected by the use of the hydrated protoxide of iron, and the proto-carbonate of iron, also the hydrated protoxide of manganese and the proto-carbonate of manganese in decomposing the sulphuret of sodium.

I shall now describe the manner in which I effect the several objects of my invention. When I use the proto-sulphate of iron to decompose common salt I proceed as follows: I add the salt (for this purpose I prefer the fine grained salt) to a boiling saturated solution of the proto-sulphate of iron, using an equivalent of each, that is to say, to a saturated solution containing 139 parts of the crystallized sulphate of iron, or seventy-six of the anhydrous sulphate, I add about seventy parts of fine salt; but to ensure the entire decomposition of the sulphate of iron, I use the salt rather in excess of the equivalents here stated. On adding the salt to the solution of sulphate of iron, mutual decomposition immediately takes place, but I prefer allowing the mixture to boil for about a quarter of an hour. The sulphate of soda in this process falls down in a state of fine anhydrous crystals. These I remove (in the usual way of removing precipitates from solutions) from the solution, which is now a chloride of iron. I allow the sulphate of soda to drain, and then wash it with a hot saturated solution of common salt, which removes any chloride of iron which may remain in the sulphate of soda.

Now I would have it observed, that I am aware that others have decomposed salt by mixing it with sulphate of iron, either in a dry state or in solution; but these decompositions have been effected by exposing the mixtures to heat in a furnace, in order to drive off the muriatic acid gas. What I claim therefore as my invention is the mode above described; namely, adding salt in the state of fine crystals, or powder, to a boiling saturated solution of proto-sulphate of iron, and by this means obtaining anhydrous sulphate of soda without any disengagement of muriatic-acid gas. My next process is to convert the sulphate of soda obtained, as above described, into sulphuret of sodium by mixing it with about one-third of its weight of coke or slack (which I prefer to use in a ground state), and exposing the mixture to heat, either in a close or in a reverberatory furnace. When removed from the furnace, it is placed into lixiviating vats, where the sulphuret of sodium is dissolved by water, and the solution allowed to run from off the unconsumed carbonaceous matter into the receiver, where it is to be used in a manner hereinafter described. I next decompose the chloride of iron (obtained by the first process) by means of the hydrate of lime; viz. into the vessel containing the hydrate of lime in the state of cream of lime. I gradually pour the solution of the chloride of iron until the excess of lime is almost entirely removed. During this operation a reaction takes place between the lime and the chloride of iron, and the products are hydrated protoxide of iron and chloride of calcium. I separate the chloride of calcium by washing with abundance of water. Having thus obtained the hydrated protoxide of iron, I add to it the solution of sulphuret of sodium (obtained as above described). During this operation the reaction which takes place produces proto-sulphuret of iron and caustic soda. I prefer, in this process, to aid the reaction by heat, which I apply by introducing steam into the mixture. I ascertain that the decomposition is completed by the solution having lost the power of blackening the salts of lead. Having separated the solution of soda from the precipitate, viz., the proto-sulphuret of iron, I introduce the latter into a close vessel (which I prefer to be of wood lined with lead), and then gradually pour sulphuric-acid (of the strength usually employed to decompose common salt), upon the proto-sulphuret of iron. The reaction which takes, place produces sulphuretted hydrogen gas, and proto-sulphate of iron. I conduct the sulphuretted hydrogen gas by a pipe leading from the vessel in which it is generated into a gas holder, of the form usually employed in coal-gas works. This sulphurretted hydrogen I cause to undergo combustion by means of burners, similar to those used for burning coal-gas, and the operation being conducted in an oven or furnace similar to one in which sulphur usually is burned in the manufacture of sulphuric-acid, the sulphurous-acid gas produced by the combustion of the sulphuretted hydrogen is converted into sulphuric-acid in the usual manner. The solution of proto-sulphate of iron produced in the above process of decomposing the proto-sulphuret of iron by sulphuric-acid, I concentrate by evaporation, until it becomes a saturated solution. I then employ it again to decompose common salt in the manner hereinbefore described. When the proto-carbonate of iron is employed to decompose the solution of sulphuret of sodium, I procure it by decomposing the chloride of iron by means of carbonate of lime; for this purpose I boil the solution of the proto-chloride of iron with powdered chalk, the re-action producing proto-carbonate of iron, and chloride of calcium. I wash the proto-carbonate of iron to free it from the chloride of calcium, and then employ it to decompose the solution of sulphuret of sodium, and in this case proceed in every respect the same as when the hydrated protoxide of iron is used. I thus obtain carbonate of soda and proto-sulphuret of iron, and then decompose the proto-sulphuret of iron, as hereinbefore described.

As to that part of my invention which relates to the mode of obtaining hydrated protoxide of iron and proto-carbonate of iron, and using such oxide or proto-carbonate in decomposing sulphate of sodium, I do not confine myself to the use of the apparatus hereinbefore mentioned for effecting the objects of this part of my invention, as other apparatus may be employed for such purpose. Nor do I claim any privilege with respect to such apparatus, nor the preparation of the protoxide of iron from the chloride of iron by means of lime; nor of the proto-carbonate of iron by means of carbonate of lime; nor the mode of converting the sulphate of soda into the sulphuret of sodium. But I do claim, as my invention, the use of the hydrated protoxide of iron obtained from the decomposition of the chloride of iron by means of the hydrate of lime, and also of the proto-carbonate of iron, obtained from the chloride by means of the carbonate of lime, to decompose the solution of sulphuret of sodium for the purpose of procuring soda or its carbonate. I also claim the use of the proto-sulphuret of iron, obtained during this process, for producing sulphuretted hydrogen gas, and the use of the proto-sulphate of iron for again decomposing common salt in the manner hereinbefore described. When I employ the proto-sulphate of manganese to decompose common salt, I proceed in the same manner in every respect as above described, in using the proto-sulphate of iron; that is to say, I add fine grained salt to a boiling saturated solution of proto-sulphate of manganese, using an equivalent of each; that is to say, to a saturated solution containing seventy-six parts of anhydrous proto-sulphate of manganese, I add about seventy parts of fine salt. By this means I obtain anhydrous sulphate of soda, as in the former case, and chloride of manganese. I decompose the chloride of manganese by hydrate of lime, in the same manner as I have described for decomposing the chloride of iron. The hydrated protoxide of manganese, thus obtained, I wash, and use to decompose the solution of sulphuret of sodium, as described in the former process. The results of the re-action in this case are caustic soda and proto-sulphuret of manganese. I decompose the sulphuret of manganese, in the manner above described, for decomposing the proto-sulphuret of iron; that is to say, by pouring sulphuric-acid upon the proto-sulphuret of manganese contained in a close vessel, and thus disengage sulphuretted hydrogen gas, and produce proto-sulphate of manganese. When the proto-carbonate of manganese is employed, I obtain it from the chloride of manganese by boiling it with powdered chalk, or other carbonate of lime, and proceed with this proto-carbonate in every respect the same as when the proto-carbonate of iron is used.

In this part of my invention I do not claim the preparation of the protoxide of manganese; nor the proto-carbonate of manganese from the solution of the chloride; but I claim the use of a saturated solution of proto-sulphate of manganese for decomposing common salt, to obtain sulphate of soda, without the disengagement of muriatic-acid gas; also the use of the hydrated protoxide, prepared from the chloride of manganese by means of hydrate of lime; the proto-carbonate of manganese, obtained by means of carbonate of lime, for decomposing the solution of sulphuret of sodium; and the use of the proto-sulphuret of manganese, for procuring sulphuretted hydrogen gas, and proto-sulphate of manganese, in decomposing common salt, by means of sulphuric-acid; and bioxide of manganese, for the purpose of procuring chlorine, a mixture of proto-sulphate of manganese and sulphate of soda is obtained. When I use this residuary sulphate of manganese, it is necessary to dissolve the mixed sulphates in hot water, and to add hydrated protoxide of manganese, to saturate the excess of acid which always exists in the mixed sulphates which form the residuum of the process for preparing chlorine; I then concentrate the solution until it becomes a saturated solution, and then add to the boiling solution an equivalent of salt, in the form of fine crystals or powder: I thus obtain anhydrous sulphate of soda, from the re-action of the sulphate of manganese and common salt. The equivalent of sulphate of soda thus formed precipitates along with the sulphate of soda, which previously existed in the solution. The chloride of manganese which remains in solution I decompose by hydrate of lime, in the manner hereinbefore described, to obtain the hydrated protoxide of manganese. The sulphate of soda obtained by this process may be decomposed by first converting it into a sulphuret of sodium, and then decomposing the sulphuret by the hydrated oxide of iron or of manganese; or it may be decomposed in the manner now commonly in use, viz. by heating the sulphate of soda with slack and limestone. In this part of my invention I claim the use of the proto-sulphate of manganese contained in the residiuum of the usual process for obtaining chlorine for decomposing common salt. When I employ the sulphate of magnesia to decompose common salt, I use it as in the former processes, in the state of a boiling saturated solution, viz., to a solution containing one hundred and twenty-three parts of Epsom salts, I add about seventy of common salt, in the state of fine crystals or powder, and boil the mixture for about a quarter of an hour, and in this case proceed in every respect in the same manner as in the case of the decomposition, by means of the proto-sulphate of iron. But in this process, chloride of magnesium and sulphate of soda are produced. I decompose the chloride of magnesium by hydrate of lime in the same manner as described for decomposing the chloride of iron. By the re-action which takes place, chloride of calcium and hydrate of magnesia are formed. After washing the latter to free it from the chloride of calcium, I add sulphuric acid, and thus form sulphate of magnesia, which I employ to decompose another equivalent of common salt. The sulphate of soda produced by this process I decompose by any of the methods hereinbefore described.

In this part of my invention I do not claim the decomposition of chloride of magnesium by hydrate of lime; but I claim the use of a saturated solution of sulphate of magnesia to decompose common salt, for the purpose of preparing sulphate of soda without the disengagement of muriatic-acid gas. When I use the sulphate of lime to decompose common salt, I boil it in the state of fine powder, with an equivalent of carbonate of magnesia and an equivalent of common salt, (that is to say): To eighty-six parts of sulphate of lime I add forty-two of carbonate of magnesia, and seventy of common salt; to these I add about five hundred parts of water;—other proportions of water may be employed, but I prefer the proportion now stated. I boil the mixture for three or four hours, the time necessary to effect the decomposition depending on the state of the sulphate of lime; when the sulphate of lime is in the state of a very fine powder, the decomposition is effected in a much shorter time than when it is employed in a coarse powder. The mixture may be boiled in an iron boiler; but I prefer putting the materials into a wooden vessel lined with lead, and heating it, by introducing steam from a boiler, by means of a pipe passing into the mixture. By the re-action which takes place carbonate of lime is formed, which precipitates, and the supernatant solution, when concentrated, yields anhydrous sulphate of soda and solution of chloride of magnesium. I decompose the chloride of magnesium by hydrate of lime, in the manner hereinbefore described, and thus obtain dydrated magnesia, which I convert into the carbonate of magnesia, by passing into it a current of carbonic-acid gas, which may be procured by any of the well-known methods of preparing the carbonic-acid gas. The sulphate of soda I afterwards decompose by any of the methods hereinbefore described. In this part of my invention I claim the use of the sulphate of lime and carbonate of magnesia to decompose common salt, in order to procure the sulphate of soda.—In witness whereof, &c.

Enrolled May 2, 1839.

Specification of the Patent granted to PIERRE ARMAND LE COMTE DE FONTAINEMOREAU, *of Charles Street, City Road, in the County of Middlesex, for an Improved Method of Preventing the Oxidation of Metals.*—Sealed May 5, 1838.

To all to whom these presents shall come, &c. &c., *Now know ye*, that in compliance with the said proviso, I, the said Pierre Armand Le Comte de Fontainemoreau, do hereby declare the nature of my said invention consists in certain improved processes of coating, covering, or enveloping metals liable to oxidation, with zinc, or some alloy of zinc, or with a paint, paste, or powder of which zinc, or any alloy of zinc, is a principal ingredient. And I declare that the manner in which the same is to be performed, is fully shewn in the following particular description of the said improved process (that is to say) :—

Whereas a patent, of date 29th April, 1837, was granted to Henry William Crawfurd, then of John Street, Berkley Square, Commander in the Navy, for an improvement in coating or covering iron and copper for the prevention of oxidation, which improvement was, by the specification thereinafter enrolled by the said Henry William Crawfurd, declared to consist in coating iron and copper with zinc, either in a state of fusion or in a solid state, reduced into powder, or applied as a paint, which coating of zinc was, in some cases, to be covered with a second coating of pure tin : And whereas the methods of effecting the said objects specified by the said Henry William Crawfurd are in several respects defective and erroneous, and zinc may be employed in other forms and states than those pointed out by him ; I declare that the object of my said invention is to remedy the defects and errors in the said methods, and by various new modes, to render zinc more universally applicable to the protection of metals from oxidation.

And first, as to the preparation of metals to receive the zinc-coating or covering, I declare that I follow generally the same process as that described by the said Henry William Crawfurd, namely, by immersing them in an acidulated bath, and then scouring them, in order to remove any oxide or extraneous matters which may be adhering to the surfaces thereof. When it is not convenient to apply the coating immediately after the articles are taken out of the bath, I deposit them, in the meanwhile, in lime-water, or some similar alkaline solution. In melting the zinc into which the articles to be coated are to be plunged, the specification of the said William Henry Crawfurd directs that the zinc shall be covered with sal-ammoniac; but instead thereof, I use with success rosin and cnate of soda, and any black or white flux capable of preserving zinc from oxidation. The zinc, according to the methods specified by the said Henry William Crawfurd, is applied only in a state of fusion, or in a solid state, reduced to powder, or mixed up into a paint; but the state in which I prefer applying it is that of dry powder, which I prepare as follows:—The zinc is put into a reverberatory furnace; every opening for the admission of the atmospheric air is carefully closed; and the temperature of the melted zinc is raised to a degree approaching red-heat. The door or lid of the furnace is then opened or lifted, and the zinc skimmed; after which, one-tenth of its weight of wrought (not cast) iron-filings, moistened with muriatic-acid, (to which some sal-ammoniac may be added,) is thrown into the fused metal, it being stirred all the while. After the introduction of the filings, the surface of the zinc must be covered over with fine charcoal-powder, and the temperature carried to about cherry-red heat, at which temperature the zinc must be maintained for one hour, stirring it occasionally with an iron rod or poker. The melted metal is then conveyed into a brick, earthen, or cast-iron trough, and covered over with a lid of cast-iron to exclude all contact with the atmosphere, and is stirred by means of an iron rod passing through a hole in the cast-iron door or lid, until by cooling it becomes so solid that it can be stirred no longer. When quite cool, it is ground into powder, and the more pliable it is found to be, the better the operation has succeeded. The powder so obtained will preserve from oxidation copper and iron, polished and filed steel, such as clock-work, articles of hardware, ironmongery, and the like, by merely covering the articles with the powder, and this even though they should be exposed to wet or damp.

The zinc may be also applied through the medium of a paint or paste in the following manner: The powder of zinc is mixed with any of the unctuous substances generally used in paints and varnishes. The substances which have been found to answer best are those which are conductors of galvanic fluid; and hence, this paint has been commonly called galvanic-paint. Very good paint is to be made with oil distilled from the refuse tar of the gas manufactories, adding one-third of spirit of tupentine. Oil varnish may also be used, but it is very expensive. Linseed oil may be employed, as it is in common paint; but is not quite so favourable to the galvanic effect. White lead or ceruse may be added to the paint, to give it some consistence. The proportions of the materials of the paint depend on the substances with which the zinc-powder is mixed, and on the uses to which the paint is to be applied.

With the same powder, a paste may be made, by rubbing copper, steel, and filed or polished iron, with which they will be effectually protected. This paste is made with melted wax, into which is put ten times its weight of powder of zinc, and about one-fiftieth of tallow or oil. For protecting small polished metal articles, a zinc-paper or wrapper is employed, manufactured by mixing powder of zinc, ground very fine, with the pulp of the paper while making, or by powdering common paper, previously covered with some adhesive substance, such as gum or flour-paste, taking care always to exclude the use of animal glue, which has a tendency to cause the iron to rust. After copper and iron have been zinced according to any of the modes hereinbefore described, they may be still further protected by scraping them with wet sand-stone, and then moistening them with a rag dipped in a solution of sal-ammoniac, by which means a muriate of zinc is formed, equal, in point of adherence, to hard varnish. I find this addition particularly useful in the case of fire-arms, filed and polished steel articles, &c. For these articles, zincing according to the methods described in the specification of H. W. Crawfurd is not sufficient. The zinc employed for this description of articles must be very pure; and if melted in earthenware crucibles, these crucibles must, where the articles are large, be placed inside other crucibles of iron or cast-iron. The empty space between the earthen and cast-iron crucibles being filled up with fine sand or lead. The melted zinc is then covered over with sal-ammoniac, or other flux, as in the other methods, but to prevent the sal-ammoniac or other flux from staining the articles by adhering to them when they are drawn from the melted zinc, some earthy substances, such as gravel, sand lime, or chalk, in pieces or powder, are mixed therewith. After the pieces are well covered over with the zincing, they are polished.

First, all unevenness in the zinc coating is made to disappear, which is effected by means of files or scrapers. Afterwards, pumice-stone, sand-stone, or emery-paper, is used, and then the polishing is terminated, as in the case of any other metal. It is important not to use hard bodies to make the coating smooth and give the polish: cork, leather, rags, or other similar things should be employed. Without this precaution, the zinc might be rubbed off in some places. It is to be observed that to take the polish well, the articles should not be previously polished.

When cannon balls, or other large articles, are required to be protected from oxidation, they should be heated, in a reverberatory-furnace, or otherwise, previous to their being zinced. The screws, and other parts of iron, that do not require to be protected, may be covered with a thin coating of clay, and where there are holes, these holes may be stopped up with wood. If it is desired that the protected articles should possess a particular grey colour, different from that of zinc, they must be plunged in red hot zinc, or having been plunged in zinc of a less heat, they must be heated red hot in a reverberatory furnace. A great disadvantage has been found to result from the contact of the fuzed zinc with the iron or cast-iron crucibles; in fact, an alloy of zinc and of iron is soon formed, by which the iron is so changed as to be nearly worthless, whilst in a few days the crucible is perforated and completely spoiled. To obviate this inconvenience, a large quantity of lead is melted in the iron or cast-iron crucible, and only a small quantity of zinc added. The zinc being lighter than lead, and not combining sensibly with that metal, always remains at the surface, and covers alone the iron hoop plunged in the crucible, as if it contained nothing but zinc. As the layer of zinc covering the lead might yet spoil the crucible, an iron hoop is placed in the interior of the crucible, so as to reach the lead; and to prevent the zinc penetrating between the hoop and the crucible, the space between is stopped up with clay. By these means the zinc, instead of spoiling the crucible, only spoils the hoop, which can easily be replaced by another. Instead of an iron hoop, an earthen one would perhaps be preferable, which, like the iron one, would descend lower than the level of the lead; but it must be observed, that the hoop should be fixed before any zinc is put into the crucible, to prevent any zinc getting between it and the hoop. The best method of heating the crucibles consists in surrounding them with either coke or charcoal. To protect nails, and other similar articles, they are first placed in a wire-basket, or in a vessel of any form, perforated with a great many holes. This basket or vessel is then plunged into melted zinc, and the metal bath covered with a layer of sal-ammoniac. The basket being drawn out of the bath is carefully shaken, so that any excess of the zinc adhering may fall off, and then it is thrown into water, or some other fluid, provided always that the fluid is such that it will not attack the sal-ammoniac. It is very important to seize the proper moment for throwing the articles into the water, but the tact in this respect is only to be acquired by practice. A perforated cylinder, or any machine of a similar kind revolving on its axis, may be used for finishing the nails, and other like articles. As soon as taken out of the bath, they should be thrown into the machine, then revolving on its axis, and this machine should be heated to a degree sufficient to prevent any superfluous zinc stopping up the holes. In the methods of protection hereinbefore specified, zinc, and the alloys of zinc, are applied in the state only of powders, paints, or pastes. But I now proceed to describe how solid plates of zinc may be combined with other metals for their protection from oxidation, or in other words, how copper, iron, and other metals may be plated therewith.

The iron, or copper, or other metal, being previously cleansed, according to the means described in the said William Henry Crawfurd's specification, the article is covered with thin sheet zinc, well powdered with sal-ammoniac, and the two sheets of metal are then passed through heated rollers, from which they are received into water in a state of perfect combination.

I declare also that there may be employed for the preservation of metals alloys composed of zinc and tin, or lead, or bismuth, or quicksilver, by melting any of these metals in a crucible with zinc, and putting the article which is to be operated upon in such mixture. When the melting takes place, a small quantity of sal-ammoniac is thrown in, and the mixture left to evaporate at a slow fire, after which the article operated upon is, before getting cold, thrown into cold water. It is to be observed, that all the articles to be so prepared must have been previously cleansed of every impurity, according to the method aforesaid.

And having now particularly described my said improved processes of coating or covering metals to protect them from oxidation, I declare that I do not claim as my invention the powder made from zinc, nor the paint or paste made with it, as they are already spoken of in Crawfurd's specification, but I claim as my invention the improved processes before described of making powder of zinc, and of applying the same in a dry state, as well as in the state of a paint or paste for the protection of metals from oxidation. I claim also the processes hereinbefore described of alloying or combining zinc with other metals and substances for the said purposes, and likewise the process before described of covering plates of metal with sheets of zinc by means of heated rollers. And such my invention being, to the best of my knowledge and belief, new and never before used in that part of Her Majesty's dominion called England, I hereby declare this as my true and faithful specification of the same.—In witness whereof, &c.

Enrolled November 5, 1838.

Specification of the Patent granted to Stephen Geary, *of Hamilton Place, New Road, in the County of Middlesex, Architect, for Certain Improvements in the Preparation of Fuel.*—Sealed May 28, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Stephen Geary, do hereby declare the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, (that is to say) :—

My invention relates to a mode of preparing fuel from certain well-known combustible and other matters, hereafter described, and in order to give the best information in my power, I will in the first place state the various matters which may be employed in preparing fuel according to my invention.

	parts.
First, pitch, or such like bituminous matters, obtained from coal-tar, or from other mineral or vegetable tar - - - - - - -	100
Secondly, coal-cinders or coke, or powdered peat, or bark of trees pulverized, or sawdust or tan, such substances or matters being in a dry state -	187½
Thirdly, clay, dry, and coursely powdered ; or, instead of clay, fine sand may be employed, or free-stone, powdered, or chalk, or plaister, or earth, or the cinders of wood, or generally any earthy matter, well powdered and dry - -	187½
Fourthly, small coal - - - - - -	500
Fifthly, acids - - - - - - - -	25
	1000

Now I would remark, that I am aware that most of these matters have before been used, or proposed to be used, for the purpose of fuel, and they have been combined together in varied proportions. I do not, therefore, lay any claim to the same separately or combined, when not according to my invention, as hereafter stated and accurately defined.

The above materials, or some of them, are to be blended together and prepared into a fuel in the following manner :—

The pitch or matter named as the first material, is to be melted in a suitable large vessel, and the cinders, or some one or more of the matters mentioned secondly, are to be gradually introduced amongst the melted pitch, keeping the matters in the vessel constantly stirred. The clay, or some one or more of the matters mentioned under the head thirdly, are to be gradually applied, and well stirred into the matters previously in the vessel, heat being constantly kept up to the matters so being mixed. One-half of the small coal may now be gradually supplied and stirred into the mixture in the vessel, and stir the matters well together till the whole mixture is equally and well heated; then pour in the acid, still stirring, (I prefer sulphuric-acid, that acid being the cheapest for the purpose; but I do not confine myself thereto, as other acids may be employed, which will produce a like effect,) which will produce a froth, and so soon as the effervescence is apparent, introduce the remainder of the small coal, stirring, in order to blend the matters equally, and continue the stirring, till the whole becomes well and equally heated, when the mixture may be permited to run from the vessel into moulds, which should be quadrangular, or other figure, which will produce blocks of a shape to pack closely together, when the same have been well dried. When the matter has been run into the moulds and partly cooled, pressure or beating may be applied, in order to compress the blocks into as small a space as possible; but this is not essential, though where stowage is material, it is desirable that the blocks should each be well beaten or pressed into the mould.

Having thus explained the nature of the materials employed by me, and the manner of combining the same, and having been particular in stating quantities of the matters which I have found best to answer the purposes, I would have it understood that variations may be made without departing from my invention, which does not consist in the quantities of the matters employed; nor is it necessary in all cases to use one or more of the matters contained under secondly and thirdly, in a fuel, though I consider it better to do so.

And I would have it understood, that what I claim as my invention is the mode of preparing fuel by combining small coal with melted pitch, and with other matters, when in a heated state, and causing the mixture to be acted on by acid, as above explained; but I do not claim the combining such materials, when an acid or acids is or are not employed.—In witness whereof, &c.

Enrolled November 28, 1838.

ALTERATIONS AND DISCLAIMERS IN SPECIFICATIONS.

In the matter of a Patent granted to the late John Henry Cassel, *of Mill Wall, Poplar, Merchant, deceased, for a Cement, or Combination of Materials, applicable to the different purposes for which Cement, Stone, Brick, or other similar substances may or can be used. Sealed April* 4, 1834.

Disclaimer and Memorandum of alteration, entered by Sophia Cassell, (widow and executrix of the said John Henry Cassell,) and Edwin Edward Cassell, (son and sole surviving Partner of the said John Henry Cassell,) with the clerk of the patents, of England pursuant to the act.

We, the said Sophia Cassell, and Edwin Edward Cassell, do hereby declare, that since the death of the said John Henry Cassell, we have been informed, that previous to the date of the said patent, other persons had used tar in various ways, with or without artificial heat, for cementing materials for purposes similar to those set forth in the specification of the said invention, such tar remaining fluid at low temperatures, and consequently, requiring either a considerable waste of fuel or a waste of time, for the atmosphere to evaporate such parts, as had kept the resinous material in a state of fluidity, and that such attempts were no more successful than some of those which the said John Henry Cassell made with materials, liquid at a temperature below 60 degrees of Fahrenheit, whereas the successful work of the said John Henry Cassell, deceased, and subsequently of us, the said Sophia Cassell and Edwin Edward Cassell, has been by mixing forming, or applying, by means of artificial heat, pitch, and resinous substances, which are not fluid at a temperature lower than 60 degrees of Fahrenheit. And further, on a careful consideration of the specification of the said John Henry Cassell, we have discovered that the following words, viz., "as in the fourth process," in the sentence, "the resin of wood I use for making stone, and cast figures that are required to be of a yellow colour, I add sand of the required colour *as in the fourth process,*" which words appearing to have been introduced in error, as they do not relate to anything in the previous part of the specification, this part of the description would be more clear and intelligible without such words; we, therefore, disclaim so much of the specification of the said patent, as includes, or may be construed to include, the using, or applying any tar or products of tar or resin, which is, or is made, at all fluid, at a temperature below 60 degrees of Frahrenheit, (excepting always the essential oil of coal tar, which has been of great benefit for saturation of the stones or earthy matter, previous to blending the said earthy matters, with the pitch or resinous substances for roads and footways.) And also, so much of the specification or wording thereof, as relates to the words, "*as in the fourth process,*" by striking out those words or reading the specification as if they were not inserted.

NOTICE OF EXPIRED PATENTS.

(*Continued from vol. xi. p.* 251.)

George Sayner, of Hunslet, Leeds, Yorkshire, Dyer, and **John Greenwood**, of Gomersell, in the said county, Machine Maker, for certain improvements in the mode or manner of sawing and cutting wood and timber by machinery.—Sealed January 11, 1825—(*For account of specification, see Repertory, Vol.* 1, *third series, p.* 114.)

Thomas Magrath, of Dublin, for a composition to preserve animal and vegetable substances.—Sealed January 11, 1825.

Thomas Magrath, of Dublin, for an improved apparatus for conducting and containing water and other fluids, and preserving the same from the effects of frost.—Sealed January 11, 1825.—(*For copy of specification, see Repertory, Vol.* 3, *third series, p.* 1.)

John Phipps, of Upper Thames Street, London, Stationer, and **Christopher Phipps**, of River, Kent, Paper Maker, for an improvement or improvements in machinery for making paper.—Sealed January 11, 1825.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 413.)

William Shelton Burnett, of London Street, London, Merchant, for a new method of lessening the drift of ships at sea, and better protecting them in gales of wind.—Sealed January 11, 1825.—(*For account of specification, see Repertory, Vol.* 1, *third series, p.* 277.)

Jonathan Andrew, **Gilbert Tarlton**, and **Joseph Shipley**, all of Crumpshall, near Manchester, Lancashire, Cotton Spinners, for certain improvements in the construction of a machine used for throstle and water-spinning of thread or yarn, whether the said thread or yarn be fabricated from cotton, flax, silk, wool, or any other fibrous substance, or mixture of substances, whatsoever; which said improved machine is so constructed as to perform the operations of sizing and twisting in, or otherwise removing, the superfluous fibres from the said thread or yarn, and is also applicable to the purpose of preparing a roving for the same.—Sealed January 11, 1825.

William Booth, of Congleton, Cheshire, Gentleman, and **Michael Bailey**, of Congleton, aforesaid, Machinest, for certain improvements in spinning, doubling, throwsting, and twisting silk, wool, cotton, flax, hemp, and such like materials.—Sealed January 11, 1825.

William Rudder, of Egbaston, near Birmingham, Warwickshire, Cock Founder, for certain improvements in cocks for drawing off liquids.—Sealed Janury 18, 1825.

William Church, of Birmingham, Warwickshire, Esquire, for

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certain improvements in casting cylinders, tubes, and other articles, of iron, copper, and other metals.—Sealed January 18, 1825.—(*For copy of specification, see Repertory, Vol.* 6, *third series, p.* 269.)

Francis Melville, of Argyle Street, Glasgow, Scotland, Piano-Forte Maker, for a method of securing that description of small piano-fortes, commonly called square piano-fortes, from the injuries to which they are liable from the tension of the strings.—Sealed January 18, 1825.

Edward Lees, of Little Thurrock, Essex, Publican, and **George Harrison**, of the same place, Brick Maker, for a new and improved method of making bricks, tiles, and other articles, manufactured with brick-earth.—Sealed February 1, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 188.)

John Thin, of Edinburgh, Architect, for a new method of constructing a roasting-jack.—Sealed February 1, 1825.

Samuel Crosley, of Cottage Lane, City Road, Middlesex, Gentleman, for certain apparatus for measuring and registering the quantity of liquids passing from one place to another.—Sealed February 1, 1825.—(*For copy of specification, see Repertory, Vol.* 8, *third series, p.* 353.)

Samuel Crosley, of Cottage Lane, City Road, Middlesex, Gentleman, for an improvement in the construction of gas regulators or governors.—Sealed February 1, 1825.—(*For account of specification, see Repertory, Vol.* 1, *third series, p.* 273.)

Timothy Burstall, of Bankside, Saint Saviour, Southwark, and **John Hill**, of Greenwich, Kent, Engineers, for a locomotive, or steam-carriage, for the conveyance of mails, passengers, and goods. —Sealed February 3, 1825.—(*For account of specification, see Repertory, Vol.* 1, *third series, p.* 198.)

LIST OF NEW PATENTS.

Alexander Gordon, of Fludyer Street, Westminster, Engineer, for an improved machine or apparatus for employing steam, or other elastic fluid, as a motive power.—Sealed May 30, 1839.—(*Six months.*)

William Armstrong, of Hawnes, near Ampthill, Bedford, Farmer, for improvements in harrows.—Sealed May 30, 1839.—(*Six months.*)

William Palmer, of Sutton Street, Clerkenwell, Manufacturer, for improvements in lamps and in the manufacture of candles.—Sealed June 1, 1839.—(*Six months.*)

Stephen Geary, of Hamilton Place, King's Cross, Architect, for certain improvements in paving or covering streets, roads, and other ways.—Sealed June 1, 1839.—(*Six months.*)

Josephine Julie Besnier de Bligney, of the Commercial Hotel, Leicester Street, Leicester Square, for improvements in umbrellas and parasols.—Sealed June 3, 1839.—(*Six months.*)

John Bradford Furnival, of Street Ashton, Warwick, Farmer, for improvements in apparatus or material to prevent persons sinking when in the water.—Sealed June 4, 1839.—(*Six months.*)

Moses Poole, of Lincoln's Inn, Gentleman, for improvements in the manufacture of soap by the application of materials not hitherto used for that purpose.—Sealed June 4, 1839.—(*Six months.*)

William Bates, of Leicester, Manufacturer, for improvements in the process of finishing hosiery and other looped fabrics.—Sealed June 4, 1839.—(*Six months.*)

Christopher Wickels, of Guildford Street, Gentleman, and **John Danforth Greenwood**, of the Belvidere Road, Manufacturer, both in Lambeth, for improvements in producing plain and ornamental articles and surfaces from cements or earths, separately, or combined with other materials.—Sealed June 4, 1839.—(*Six months.*)

Joshua Procter Westhead, of Manchester, for an improvement or improvements in the manufacture or construction of stays or corsets.—Sealed June, 4, 1839.—(*Six months.*)

William Prior, of Rhoyd Street, in the Borough of Lambeth, Gentleman, for certain improvements in the carriages and axle-trees of wheel carriages.—Sealed June 6, 1839.—(*Six months.*)

Arthur Parsey, of the Quadrant, Regent Street, Artist, for improvements in obtaining motive power.—Sealed June 6, 1839.—(*Six months.*)

Harrison Grey Dyar, of Regent Street, Gentleman, and **John Chisholm**, of Pomeroy Street, Old Kent Koad, Manufacturing Chemist, for improvements in obtaining sulphur from pyrites, or certain native sulphurets—Sealed June 6, 1839.—(*Six months.*)

Baron Henry de Bode, of Great Portland Street, Cavendish Square, for improvements in the means of rendering magnetic needles less prejudicially influenced by local attraction, which improvements are applicable to other magnetic objects for the same purpose.—Sealed June 8, 1839.—(*Six months.*)

Francois Bouillon, of Princes Street, Hanover Square, for improvements in the manufacture of ornamental woven fabrics.—Sealed June 8, 1839.—(*Six months.*)

Goldsworthy Gurney, of Bude, in the county of Cornwall, Esquire, and **Frederick Rixon**, of Cockspur Street, Pall Mall, for improvements in the apparatus for producing and distributing light.—Sealed June 8, 1839.—(*Six months.*)

Charles Andrew Caldwell, of Audley Square, Esquire, for improvements in furnaces and apparatus for applying the heat of fuel.—Sealed June 8, 1839.—(*Six months.*)

Moses Poole, of Lincoln's Inn, Gentleman, for improvements in printing calicoes and other fabrics.—Sealed June 11, 1839.—(*Six months.*)

Charles Chubb, of St. Paul's Church Yard, London, and **Jeremiah Chubb**, of Red Lion Street, Clerkenwell, Mechanist, for improvements in apparatus and machinery for preserving books, and other papers, documents, and articles, from fire.—Sealed June 11, 1839.—(*Six months.*)

William Hawes, of Old Barge House, Christ Church, Soap Manufacturer, for improvements in the manufacture of soap, part of which improvements are applicable to preparing tallow for the manufacture of candles.—Sealed June 12, 1839.—(*Six months.*)

William Graunsell, of South Lincoln, Machine Maker, for improvements in apparatus for drilling corn, grain, pulse, and manure.—Sealed June 12, 1839.—(*Six months.*)

Nicholas Harvey, of Hayle, Cornwall, and **William West**, of St. Blazey, in the same county, Mechanist, for an improved valve for machines for raising water and other liquids.—Sealed June 12, 1839.—(*Two months.*)

William Watson, of Temple Street, Dublin, Gentleman, for an improvement in the construction of ships, and which improvement is also applicable to all kinds of seagoing vessels, and also certain improvements in the construction of boats and other vessels intended to be used on canals and inland navigation.—Sealed June 12, 1839. —(*Six months.*)

William Newton, of Chancery Lane, Civil Engineer, for an improved medicinal compound or ferruginous preparation, to give tone and vigour to the human system, particularly applicable in cases of weak digestion, and in the diseases called " chlorosis."—Sealed June 12, 1839.—(*Six months.*)

Joseph Sanders, of Burton-on-Trent, in the county of Stafford, Gentleman, for an improved lock and key.—Sealed June 12, 1839.—(*Two months.*)

Edward Loos, of Air Street, Piccadilly, Chymist, for improvements in extracting the saccharine matters from sugar-canes and other substances of a saccharine nature, which improvements are also applicable in extracting colouring matters from wood and other matters used in dyeing.—Sealed June 17, 1839.—(*Six months.*)

Alexander Francis Campbell, of Great Plumstead, Norfolk, Esquire, and **Charles White**, of the city of Norwich, Mechanic, for improvements in ploughs, harrows, scarifiers, cultivators, and horse-hoes.—Sealed June 17, 1839.—(*Six months.*)

Richard Beard, of Egremont Place, New Road, Gentleman, for improvements in printing calicoes and other fabricks.—Sealed June 17, 1839.—(*Six months.*)

Bryan T'Anson Bromwich, of Clifton-on-Tone, Worcester, Gentleman, for improvements in machinery, to be worked by the application of the expansive force of air or other elastic fluids to obtain motive power.—Sealed June 17, 1839.—(*Six months.*)

Heurik Zander, of North Street, Sloane Street, Gentleman, for improvements in steam-engines, steam-boilers, and condensers.—Sealed June 17, 1839.—(*Six months.*)

Henry Le Messurier, of St. Peter Port, Guernsay, Master Plumber, for improvements in pumps.—Sealed June 17, 1839.—(*Six months.*)

John Lee Benham, of Wigmore Street, Ironmonger, for an instrument or apparatus for correctly ascertaining the number of passengers conveyed in omnibusses and other public carriages.—Sealed June 18, 1839.—(*Six months.*)

John Wright, of Park Place, Glasgow, for certain improvements in mixing or alloying iron with other metals, for the purpose of increasing its strength, tenacity, or cohesion, which alloys among many other uses are particularly applicable to the construction or manufacture of links for chains and rings, and certain machinery, for effecting such manufacture.—Sealed June 18, 1839.—(*Six months.*)

Ambrose Bowden Johns, of Plymouth, Artist, for improvements in colouring or painting walls and other surfaces, and preparing materials used for that purpose.—Sealed June 19, 1839.—(*Six months.*)

Peter Lomax, of Bolton-le-Moors, Weaver, for certain improvements in looms, for weaving.—Sealed June 19, 1839.—(*Six months.*)

John Wertheimer, of West Street, Finsbury Circus, for certaim improvements in preserving animal and vegetable substances and liquids.—Sealed June 20, 1839.—(*Six months.*)

Charles Wye Williams, of Liverpool, Gentleman, for certain improvements in boilers and furnaces designed to economize fuel and heat.—Sealed June 22, 1839.—(*Six months.*)

HENRY WILKINSON, of Pall Mall, Gun Maker, for an improvement in fire arms.—Sealed June 22, 1839.—(*Six months.*)

JOSEPH PONS, of Union Cresent, New Kent Road, Gentleman, for an improved process of hardening wood and iron, and rendering wood repulsive of vermin, and proof against dry rot.—Sealed June 22, 1839.—(*Six months.*)

MATTHEW PUNSHON, of Norfolk Street, Blackwall, Engineer, for an improved steam-engine, certain parts of which improved steam-engine are applicable to steam-engines on the ordinary construction.—Sealed June 22, 1839.—(*Six months.*)

GEORGE CALDER, of Fen Court, Fenchurch Street, for certain improvements in stoves or apparatus for roasting, baking, or cooking, which he intends to denominate a Plantanum Roaster.— Sealed June 22, 1839.—(*Six months.*)

FREDERICK PARKER, of New Gravel Lane, Shadwell, for improvements in revivifying or reburning animal charcoal.—Sealed June 22, 1839.—(*Four months.*)

WILTON GEORGE TURNER, of Park Village, Regent's Park, and **HERBERT MINTON**, of Langfield Cottage, Stoke-upon-Trent, Stafford, for an improved porcelain.—Sealed June 22, 1839.—(*Six months.*)

LUKE HEBERT, of Birmingham, Civil Engineer, for an apparatus for producing and communicating artificial light.—Sealed June 22, 1839.—(*Six months.*)

JOHN ALEXANDER PHILIP DE VAL MARNIO, of Margaret Street, Cavendish Square, for certain improvements in the manufacture of gas, and in the apparatus employed for consuming gas for the purpose of producing light.—Sealed June 22, 1839.—(*Six months.*)

EDWARD BROWN, of Whiterock, Glamorgan, Copper

Smelter, for a new principle to be applied in the roasting and refining of copper, whereby the oxidation of the metal is reduced, and the same is rendered more pure and ductile.—Sealed June 22, 1839.—(*Six months.*)

Joseph Jennings, of Bessow Bridge, Cornwall, Assay Master, for a process for obtaining metal from pyrites or mundic.—Sealed June 22, 1839.—(*Six months.*)

William Vickers, of Firs Hill, Sheffield Street, Manufacturer, for an improvement in the manufacture of cast-steel.—Sealed June 25, 1839.—(*Six months.*)

John Arrowsmith, of Bilston, Stafford, Civil Engineer, for certain improvements in steam-engines.—Sealed June 25, 1839.—(*Six months.*)

James Bingham, of Sheffield, Manufacturer, and **John Amory Boden**, of the same place, Manufacturer, for certain improved compositions which are made to resemble ivory, bone, horn, mother-o'-pearl, and other substances applicable to the manufacture of handles of knives, forks, and razors, piano-forte keys, snuff boxes, and various other articles. — Sealed June 26, 1839. — (*Six months.*)

Claude Schroth, of Leicester Square, Gentleman, for certain improvements in the process, manner, or method of embossing or producing raised figures, designs, or patterns, on leather, or such like materials, and in the manner or means used for effecting the same; also in the making or forming of certain tools or apparatus used therein.—Sealed June 26, 1839.—(*Six months.*)

Pierre Auguste Ducôte, of Saint Martin's Lane, for certain improvements in the art of printing on paper, calicoes, silks, and other fabrics.—Sealed June 26, 1839.—(*Six months.*)

William Newton, of Chancery Lane, Civil Engineer, for certain improvements in the construction of sun-dials designed to shew mean time.—Sealed June 27, 1839.—(*Six months.*)

THE

REPERTORY

OF

PATENT INVENTIONS.

No. LXVIII. NEW SERIES.—AUGUST, 1839.

Specification of the Patent granted to Peter Fairbairn, *of Leeds, in the County of York, Machine Maker, for Certain Improvements in Looms for Weaving Ribbons, Tapes, and other Fabrics.*—Sealed June 22, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Peter Fairbairn, do hereby declare that the nature of the invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following description thereof, reference being had to the drawings hereunto annexed, and to the letters and figures marked thereon (that is to say) :—

This invention of improvements in looms for weaving ribbons, tapes, and other fabrics, consists in a new arrangement of mechanism, suited to the construction and working of a machine for weaving narrow goods by the agency of steam or other power applied to a rotatory shaft, the leading features of which are,

Firstly, a peculiar disposition of the treadles or harness, and of the batten or lathe, and of the mechanism by which they are actuated.

Secondly, a method of driving the shuttle, by pointed levers, worked by segment racks, instead of employing pickers.

Thirdly, a mode of effecting the taking up of the work and of regulating that taking up according to the increasing diameter of the work-roller.

Fourthly, the mechanism for knocking off, that is, stopping the evolutions of the loom, in the event of the shuttle failing to reach its proper destination; and,

Fifthly, the combination of a series of such looms in one general frame, all of which are independent of each other, though driven by one common shaft extending through the whole series.

Description of the Drawing

In the accompanying drawing, fig. 1, is an end view of the loom taken in geometrical elevation, a part of the frame being removed, in order to shew the mechanism which is attached to the inner side of the frame.

Fig. 2, is a front elevation of the same, the similar letters of reference pointing out corresponding parts of the machinery. The warp-beam or roller, A, is mounted in adjustable arms, B, at the upper part of the back of the frame, from whence the warp threads proceed, through stationary guide-pins, C, between the dividing rods, D, and thence through the treadles, E E, and reed, F, over the breast-beam, G, to the work-beam or roller, H. The warp-beam, A, and work-beam, H, are held tight by a friction-band, I, I, I, which passes over a pulley, J, on the axle of the work-roller, and also over a pulley on the warp-roller, A, and under the tension pulleys, K, K, attached to a weighted lever, L, for the purpose of keeping the warp-threads at their proper tension. The main driving shaft shewn at M, extending through the machine, (indeed through the series of machines,) is mounted in suitable bearings on the lower part of the frame. At the outer end of this shaft, the rigger or driving-pulley, N, is affixed, by which the shaft is driven, through the agency of a band from the steam-engine or other first mover. Upon this main shaft, M, a strap-pulley, O, is likewise fixed, which carries an endless strap, P, communicating with a corresponding pulley, Q, fast on the crank-shaft, R, mounted on bearings in the frame above; and along side of this fast pulley, Q, there is also a loose pulley, S, sliding round upon the crank-shaft, so that by shifting the endless strap, P, sideways on to the fast or to the loose pulley, the working parts of the loom may be set going, or brought to rest; and when going, their movements are regulated by a fly-wheel, T, fixed on the crank-shaft. The batten or lathe, U, holding the reed, and the shuttle and the apparatus for driving it, is affixed to the legs or swords, V, which have their bearings on pivots in the frame below. A connecting-rod, W, attached to the crank on the shaft, R, is also attached by a joint to the legs, V; hence, as the crank-shaft revolves, the batten or lathe is made to vibrate. On the crank-shaft, R, there is also affixed a toothed-wheel, X, which takes into another toothed-wheel, Y, of twice the diameter of the former on a shaft, Z, below, turning in suitable bearings on brackets, extending from the end frames. Upon this shaft, Z, there are likewise certain tappets or cams for working the levers attached to the under parts of the treadles or harness, which answer to treadle-levers; and there are also other cams for moving two lower levers, which are connected to the mechanism that actuates the shuttle.

Having now pointed out the general construction of the loom, I proceed to describe the manner in which it affects the operation of weaving, and the minor parts of the mechanism by which its evolutions are performed. The warp-threads being distended as said, and the driving power applied to the shaft, M, through the rigger or driving-pulley, N, the first thing to be done, in order to set the loom at work, is to raise the perpendicular rod, *a*, by drawing up its handle in front of the machine into the position shewn in fig. 1, where it will be seen, that a spring acting against the rod will press it back, and cause a notch at the hinder part of the rod to take hold of a horizontal catch-bar, *b*, which will hold up the rod, and thereby keep the works going, until they may be required to be stopped. The lower end of this upright rod, *a*, is attached by a joint to a lever, c, affixed on the end of a horizontal shaft, *d*, mounted on brackets on the further side frame. The reverse end of this shaft, *d*, carries an arm, *e*, connected by a joint to the strap-guider, *f*; hence by drawing up the perpendicular rod, *a*, the strap-guider will be made to turn upon its fulcrum-pin, and to shift the driving strap, P, from the loose to the fast pulley, Q, and consequently to give rotary motion to the crank-shaft, R, and from thence through the wheels, X and Y, to the tappet-shaft, Z. These two shafts, R and Z, being thus made to revolve, the crank will work the connecting-rod, W, and thereby give the required vibratory action to the batten or lathe, U; at the same time the rotation of the tappets on the shaft, Z, will lift the levers, *g*, *g*, alternately, and by that means cause one of the treadles or harness, E, to rise, whilst the other treadle descends, opening the sheds of the warp, for the purposes of allowing the free passage of the shuttle between them. The means by which the treadles are worked, and the batten or lathe made to vibrate, being now understood, I proceed to describe the mechanism employed for driving the shuttle to and fro in the lathe. To assist this description, the lathe is shewn detached from the machine, at fig. 3, which represents its front side. U, is the lathe; V, V, its legs; and F, the reed, as in the former figures. The shuttle, *h*, is moved to and fro in the race or groove, *i*, *i*, of the lathe, by means of the pointed ends of two levers, *k*, *k*, which points alternately take into holes shewn by dots in the shuttle, and, as the levers, *k*, *k*, slide to and fro, carry the shuttle through the sheds of warp. The movements of these pointed levers are derived from the rotary cams on the shaft, z, (see fig. 1,) which cams act upon the levers, *l, l,* connected to the bent rods, *m, m.* The upper ends of these bent rods, *m,* are attached to arms extending from a segment-rack, *n,* (see fig. 3,) which segment-rack, *n,* turns upon a centre pin in a bar affixed to the upper parts of the legs of the lathe; consequently, as the levers, *l, l,* are moved up and down by the rotary cams, the bent rod, *m,* will be moved up and down also, and give vibratory actions to the segment-rack, *n.* The teeth of this segment-rack, *n,* take into another segment-rack, o, affixed to the upper part of a forked lever, *p,* mounted on a fulcrum-pin, in a bar attached to the edge of the lathe below; hence, as the rack, *n,* vibrates, the rack, o, and the forked lever, *p,* will be made to vibrate likewise. The forked lever, *p,* carries, upon a stud fixed near the middle of its length, a rocking lever, *q, q,* which rocking lever supports on pivot-joints the lower ends of the pointed levers, *k, k.* In the under part of each fork of the lever, *p,* there is a notch, *r,* which notches, respectively, as the forked lever, *p,* vibrates, take hold of a square stud, *s,* fixed in the back of each of the levers, *k.* By these means the movements of the forked lever, *p,* cause the pointed ends of the lever, *k,* to pass to and fro with a sliding movement in front of the shuttle-race, for the purpose of drawing the shuttle through the sheds of warp; and in order to guide the points of the levers, *k,* at the proper times into and out of the holes in the shuttle, recesses or curved grooves, *t, t,* are formed in the front of the batten or lathe to receive the studs or anti-friction rollers, *u, u,* which are attached to the backs of the pointed levers, *k.* It will now be perceived that as the levers, *k,* are carried to and fro, the studs acting in the curved grooves, *t, t,* will cause the point of each lever to rise on the approach of the shuttle, for the purpose of entering, and take hold of the shuttle, and to descend again and quit the shuttle, when the point of the lever has performed its duty. It is only necessary to add that a plate must be placed over that part of the face of the lathe or batten in which the grooves, *t*, *t*, are formed, for the purpose of confining the movements of the levers, *k*, that is, keeping them close against the face of the lathe. This plate is removed in fig. 3, in order to shew the grooves, but in fig. 2, it is seen in its place, at v, v.

The first and second heads of the invention having been now fully explained, as well as the manner in which this improved machinery performs the operation of weaving, I proceed to describe the apparatus by which the taking up of the work is effected and regulated according to the quantity accumulated upon the work-beam. To the leg, v, of the lathe, a connecting rod, *w*, is attached, by a pin passed through a long slot in the rod, (see fig. 1,) which allows the rod to slide lengthwise as the lathe vibrates, the reverse end of the rod, *w*, is attached to the arm, *x*, of a three-armed lever, *x*, *y*, *z*, mounted upon a stud (*a*), fixed in the frame of the machine at the right hand side of fig. 2. Upon this stud a ratchet-wheel (*b*), having very fine teeth, turns loosely; and the end of a click or catch (*c*), connected to the arm, *y*, of the three-armed lever, takes into the ratchet-teeth. As the lathe vibrates, the connecting-rod, *w*, will cause a small rotary movement to be given to the three-armed lever, and at every stroke of the lathe cause the click (*c*), to drive the ratchet-wheel onward. A pinion affixed to the side of the ratchet-wheel, *b*, shewn by dots, takes into a toothed-wheel (*d*), turning loosely on another stud below, and a pinion, *e*, on the side of the wheel, *d*, takes into a toothed-wheel, *f*, fixed on the shaft of the work-roller, H. Thus by the occasional movements of the ratchet-wheel, *b*, driven by the vibratory actions of the lathe, the train of wheels and pinions will be made to turn slowly, and the work-roller, H, to take up or wind on the work as it comes down from the breast-beam. As, however, the amount of the taking up motion of the roller, H, upon which the work is wound, is required to be diminished in proportion to its increasing diameter, that object is effected through the agency of a friction-roller, *g*, mounted at the end of a bar, *h*, turning on a fulcrum pin, at *i*, the roller, *g*, being made to bear against the periphery of the work-roller by the force of a weight appended to the lever. The reverse end of this lever, *h*, is connected to a perpendicular sliding-rod, *k*, having a small arm, *l*, extending from its upper end, on which the arm, *y*, of the three armed lever bears; consequently, as the diameter of the work-roller, H, becomes enlarged, the roller, *g*, will become depressed, and the reverse end of its lever, *h*, be made to raise the perpendicular rod, *k*, with its arm, *l*, and thereby to contract the extent of rotary action of the three-armed lever, and cause the driving-click, *c*, to move the ratchet-wheel, *b*, a smaller portion of a rotation at every stroke of the lathe.

I now proceed to shew the manner in which the knocking off or stopping the evolutions of the loom is effected. It has been before said, that in order to keep the machinery going, the perpendicular rod, (*a*,) must be held up by the catch-bar, *b*. This catch-bar is mounted on two perpendicular rocking-levers, *m*, *m*, the pivots of which are below fixed in the side-frame. As the three-armed lever is made to vibrate through the agency of the lathe or batten, as before described, a tooth on the arm, *z*, is brought against a projection on the inner side of a butt-lever, *n*, which pushes back that lever, and also the catch-bar, *b*, with the rocking-levers connected to it. But this movement is not intended to be sufficient to withdraw the end of the catch-bar, *b*, completely from the rod, (*a*,) but only to prepare it, in order that the rod, *a*, might be readily released in case of the shuttle by accident stopping between the studs of the warp. On the plate in front of the loom, immediately over the breast-beam, G, a pronged lever, O, is mounted upon an axle, *p*.

The end of the prongs of this lever are bent downwards, as shewn in fig. 1, and the tail of the lever has a nib, *q*, which is in contact with a tooth, *r*, upon a small shaft, *s*, extending across the front of the machine. This tooth, *r*, is kept against the nib or tail of the lever by a weighted cord, *t*, attached to a pulley fixed on the shaft, *s*, and another tooth, *u*, fixed on the same shaft acts against the butt end of the lever, *n*. Now in the event of the shuttle, *h*, stopping short of its destination in the groove or race, *i*, *i*, the edge of the shuttle will, by the beating up of the lathe, be made to strike against one of the bent prongs of the lever, o, which will lift the pronged lever, and in so doing depress the nib, *q*, and force back the tooth, *r*, fixed on the small shaft, *s*. The rotary movement thus given to the shaft, *s*, will cause the tooth, *u*, to force back the lever, *n*, and in so doing to draw the end of the catch-bar, *b*, from supporting the rod, *a*, when the rod, *a*, will instantly descend, and by turning the shaft, *d*, move the strap-guider, *f*, and throw the driving-strap from the fast to the loose pulley, by which means the evolutions of the loom will be suspended.

The last feature of the improvement is associating a series of these narrow looms in one general frame, side by side, in which the side-frame of one loom is made the side-frame of the next loom adjoining, the whole being driven by one shaft, H, extending through the series, but each loom being independent of its neighbour, and actuated by its own particular mechanism and driving-strap, as above described.

Lastly, I desire it to be understood that though I have shewn in the figures of the accompanying, drawing many parts of machinery and apparatus which are common to other looms, yet I do not intend to claim the same as forming any parts of these improvements, except the particular way in which they are arranged and adapted, as described; but the improvements which I do specifically claim as new, and which are secured to me by the

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KNILL'S PATENT

Fig 2

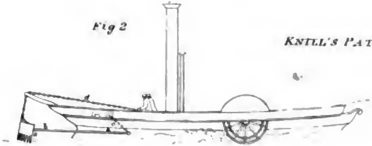


Fig 1

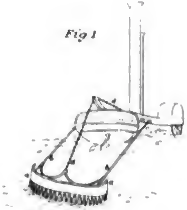
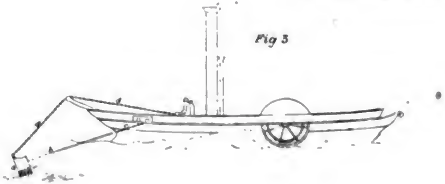


Fig 3



FAIRBAIRN'S PATENT

Fig 2

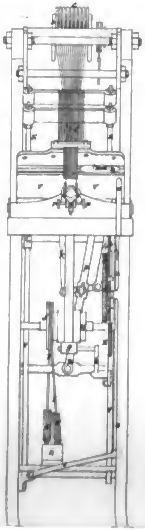


Fig 1

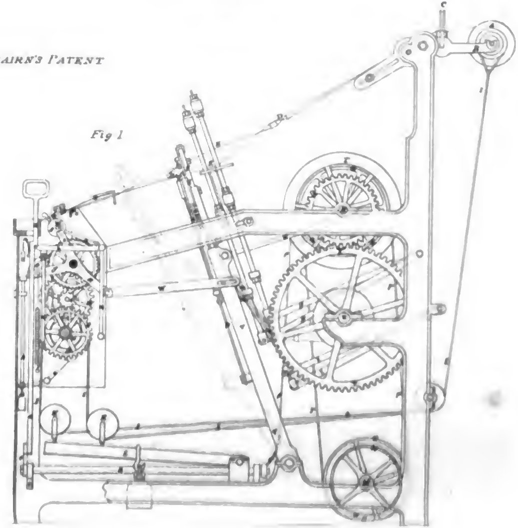
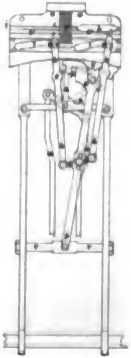


Fig 3



above recited letters patent, are those set out under the five several heads at the commencement of this my specification, and the details of which are fully described by the drawings and subsequent explanation thereof.—In witness whereof, &c.

Enrolled December 23, 1838.

Specification of the Patent granted to HENRY KNILL, *of Eldon Place, Grange Road, Bermondsey, in the County of Surrey, for Improvements in Cleansing the Bottoms of Docks, Rivers, and other Waters.*— Sealed August 30, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.— *Now know ye,* that in compliance with the said proviso, I, the said Henry Knill, do hereby declare the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

My invention relates to a mode of cleansing the bottoms of docks, rivers, and other waters, by means of a steam-boat or vessel having a rake, or such like proper instrument for drawing or raking the mud into a tideway or stream, in order to the same being carried away; and in order to give the best information in my power for carrying out my invention, I will proceed to describe the drawing hereunto annexed.

Description of the Drawing.

Fig. 1, represents a steam-boat or vessel looking obliquely across the stern, there being a rake from the stern.

Fig. 2, is a side view of the steam-boat, with the rake raised; and,

Fig. 3, another side view, with the rake lowered in a working position. In each of these figures the same letters indicate similar parts, *a*, *a*, being a strong rake, which is made of wrought iron, with teeth, as is shewn in the drawing. *b*, *b*, are strong rods of iron affixed to the rake, *a*. These rods are attached by chains, *c*, *c*, to the sides of the steam-boat or vessel, by which means sufficient play is allowed, and the rake will be kept upright and well to its work, when the steam-boat or vessel is moving. *d*, is a chain which is attached to the rake, *a*, and passing over the stern, is worked by a windlass. By this arrangement the rake can readily be raised when it is desired to be put out of action.

In cleansing the bottoms of waters, according to my invention, suppose it to be a dock, or other water, opening into a tide-way or stream, the steam-boat is caused to rake up the bottom, and thereby to disturb the mud, and to draw it out towards and into the tide-way or stream. The consequence of such raking or disturbing of the mud will be that it will mix with the current, and will flow as well as be raked into the stream or tide-way, by which the mud will be carried away; and in cleansing the bottoms of rivers, particularly in quiet places in some degree out of the tide-way or stream, where deposits of mud accumulate quickly, the steam-boat, by the rake, or such like apparatus, disturbs and rakes the mud, and it flows as well as is drawn into the tide-way or stream; and thus by my invention may the bottoms of docks, rivers, and other waters be cleansed with facility. And I would remark, that it is not necessary that the steam-boat should be constructed particularly for this purpose, as any of the constructions now used may be employed for the purpose of my invention; and it will be evident that if the steam-boat is not constantly at work for the cleansing of the bottoms of docks, rivers, or other waters,

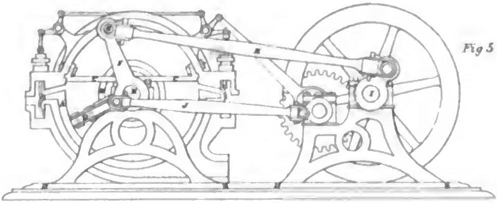
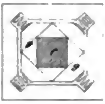


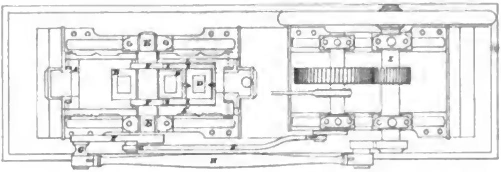
Fig 5



Fig

BUNNETT'S PATENT

Fig 6



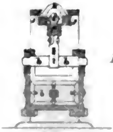
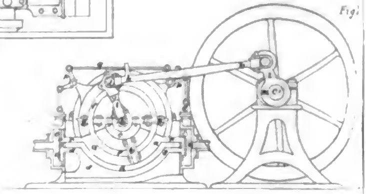


Fig 2

Fig 1



Transverse Section of Fig 5 shewing the manner of Packing the Piston & Axis

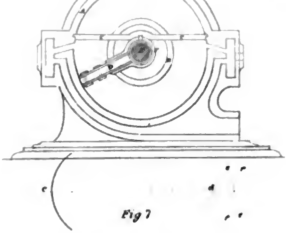
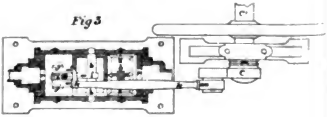


Fig 7

Fig 3



BEART'S PATENT

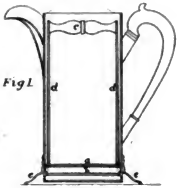


Fig 1

Plan of Fig 1

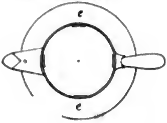


Fig 2

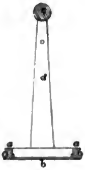
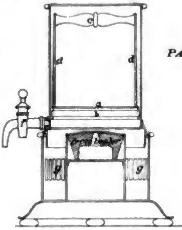
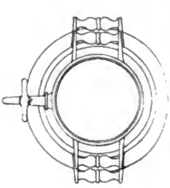


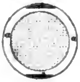
Fig 3

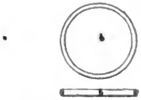


Plan of Fig 3



Plan of Fig 2





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LONDON Hodson 112 Fleet Street August 1 1839

it may be used as a steam-tug or tow-boat, or other useful purposes, having first removed the rake and apparatus which is applied for the purposes of my invention. And I would have it understood, that although I have shewn a particular construction of rake and apparatus for connecting it to the stern of a steam-boat or vessel, I do not confine myself thereto, as the construction of the rake, as well as the apparatus, may be varied; and it will be evident that although I have only shewn one rake as applied to the stern, yet more may be used, and from different parts of the steam-boat or vessel.

Having thus described the nature of my invention, I would have it understood that I do not claim any of the apparatus separately, nor the steam-boat shewn and mentioned when separately considered; but what I claim as my invention is the mode of cleansing the bottoms of docks, rivers, and other waters, by means of a steam-boat, and suitable apparatus combined therewith, as above described.—In witness whereof, &c.

Enrolled February 28, 1839.

Specification of the Patent granted to JOSEPH BUNNETT, *of Deptford, in the County of Kent, Engineer, for Improvements in Steam-Engines.* — Sealed June 14, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c., *Now know ye*, that in compliance with the said proviso, I, the said Joseph Bunnet, do hereby declare, that the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

My invention relates, first, to the application of a ring or circular piston-rod to the piston of a steam-engine.

Secondly, to a mode of arranging the steam-chamber, and piston working therein, of a steam-engine, as hereafter explained; and,

Thirdly, to a mode of obtaining two revolutions of a crank, by means of a connecting-rod, one end of which is caused to pass through an arc of a circle; and in order to give the best information in my power, I will proceed to describe the drawings hereunto annexed.

Description of the Drawings.

Fig. 1, represents an elevation of a steam-engine, constructed according to my invention.

Fig. 2, shews a transverse section of the engine at the time when the piston is at half-stroke.

Fig. 3, is a plan of the engine at a time when the piston is at one end of the stroke; and

Fig. 4, shews the metallic packing of the piston-rod, the section of which is square, though that figure is not absolutely necessary. I prefer it, because it offers greater convenience of making in the lathe than the circular or other sections do. The chamber, *a*, in which the piston, *b*, works, is produced by the space left between two cylinders, *c*, *d*, or portions of cylinders; there being suitable end-plates or covers, *e*, at each end of the cylinders, *c*, *d*. Only a portion of the space between the cylinders, *c*, *d*, is employed as the chamber in which steam acts, the upper part of the cylinder, *c*, being used as a means of carrying the parts which work the slides, and it has a slit or opening through which the connection of the connecting-rod works, as is clearly shewn in the drawing. *f*, is the piston-rod, which is a circular ring affixed to the piston, and working through two stuffing boxes, *g*, *g*, as is clearly shewn in the drawing, the piston-rod being made in two parts, and bolted together, in order to pass it through the stuffing-boxes, *g*, *g*. *h*, is a fixed axis, on which the rocking-arm, *i*, moves freely. The piston-rod, *f*, passes through the rocking-arm, *i*, and is keyed thereto, and the rocking-arm has a cross-head, or strong pin, *j*, to which the forked connecting-rod, *k*, is connected by straps, as is shewn; the other end of the rod, *k*, being connected to the crank, *l*, all which will readily be traced in the drawing. *m*, is an eccentric on the crank-shaft. l^1, the eccentric working the slides, *n*, by means of the rods, *o*, (which work through stuffing-boxes); these rods being worked by the bell-cranks, *p*, such bell-cranks being connected together by the rod, *q*, as is shewn in the drawing. *r*, is the steam-ways into and from the cylinder; and *s*, is the eduction-way leading to the condensor, when used as a low-pressure engine, or such eduction-way leads by a pipe, or otherwise, to the atmosphere, when the engine is intended as a high pressure engine, which is well understood by engineers. It will only be desirable further to state, in respect to this engine, that I lay no claim to any of the parts separately, other than the application of the ring or circular piston-rod working through stuffing-boxes, and it will be evident that other arrangements of packing such piston-rod may be resorted to without departing from my invention; and other variations may be made, so long as the piston-rod be retained.

I will now proceed to describe the second and third parts of my invention.

Fig. 5, shews an elevation in section, and,

Fig. 6, a plan in section, of a steam-engine having the second and third parts of my invention applied thereto; and

Fig. 7, shews a diagram of the mode of obtaining the length of crank, which will be caused to revolve twice by the connecting-rod (the opposite end of the connecting-rod to that which is attached to the crank) moving through a given arc of a circle. The chamber in which the steam works the piston, is produced by means of two fixed cylinders, A, B. The inner cylinder, B, being shorter than the outer cylinder, A; and the two cylinders, A, B, are secured together by the partition, C. These parts may be of one casting, though I prefer they should be of separate parts; by that means I am enabled to bore the cylinder, A, on the inside, and turn the outer surface of the cylinder, B, more readily for the piston to work against, than could be performed by making those parts in one casting, as will readily be understoood by engineers. D, is the piston which is affixed to the axis, E, by means of bosses, F; and it will be seen that those parts of the piston which are affixed to the axis, E, work between the ends of the cylinder, B, and the inner surface of the covers of the cylinder, A; consequently, the surface of the piston, which comes in contact with such end surfaces, is to be packed steam-tight, as well as the surface which works against the cylinder, B, and the surfaces of the covers and cylinder, A. The mode of packing the piston is clearly shewn in the drawing, though I do not confine myself to the mode there shewn, as variations may be made. The other parts of this engine, such as the steam-ways and modes of working the slides, are similar to what has been described in respect to the previous engine; but in this case, the eccentric, which works the slides, is not put on the crank-shaft of the engine, but is placed on another shaft, which only revolves at half the speed of the crank-shaft. On the axis, E, is keyed the arm, F, which carries the crank-pin, G, to which one end of the connecting-rod, H, is applied to the other end of the connecting-rod, being attached to the crank on the shaft, I. By this arrangement, I am enabled to obtain two revolutions of the crank-shaft, I, for each stroke of the engine, as will be better understood when I further proceed to describe the third part of my invention. J, is a rod attached at one end to a crank-pin, carried by a projection of the arm, E, the centre of such crank-pin being on a line at right angles to that pin to which the connecting-rod, H, is attached; the other end of the rod, J, being attached to a crank-pin of the axis, which works the slides. By this arrangement, when the centres of the connecting-rod, H, are in a right line with the centre of the crank-shaft, the parts will be insured to move correctly and without shock.

Fig. 7, represents a diagram of the mode of obtaining the length of throw of a crank for a given arc of a circle. Let *a, b,* be the arc; and *c, d,* the length of a connecting-rod, for which it is desired to obtain the throw of a crank, to which it is desired to communicate two revolutions for each time the end of the connecting-rod is caused to move from *a* to *b*, and *b* to *a;* open the compass from *c* to *d*, which is to be the length of the connecting-rod determined on, and describe the arc, *d,* then from the point, *a,* describe the arc, *f, f,* and from point, *b,* describe the arc, *e, e;* then on a point on the line, *c, d,* between the arcs, *d, e, f,* describe a circle which will touch the arcs, *d, e, f,* and half the diameter of such circle will be the throw of crank desired, and which will be caused to revolve twice for every time the end of the connecting-rod at *c,* is caused to move from *a* to *b,* and *b* to *a.* Hence whatever be the description of steam-engine to which it is desired to apply this part of my invention, it will be necessary so to arrange the parts, that one end of a connecting-rod should constantly describe the arc of a circle, and the other end of the connecting-rod applied to a crank with a suitable throw for such arc, and such crank will be caused to revolve twice for each movement of the other end of the connecting-rod, from *a* to *b,* to *b, a,* of the arc which it describes. I do not, therefore, confine myself to any particular construction of steam-engine, but claim to apply this part of my invention to any construction of steam-engine from which such motion may be beneficially produced.

Having thus described the nature of my invention, and the manner of performing the same, I would have it understood, that what I claim under the above recited letters patent, is, first, the application of a ring or circular piston-rod, to the piston of a steam-engine, as above described.

Secondly, I claim the mode of arranging and affixing the cylinder, B, within the cylinder, A, in combination with the peculiar construction of piston, as above described.

Thirdly, I claim the mode of obtaining two revolutions of crank from a connecting-rod actuated by a steam-engine, and caused to perform an arc of a circle as above described.—In witness whereof, &c.

Enrolled December 14, 1838.

Specification of the Patent granted to ROBERT BEART, *of Godmanchester, in the County of Huntingdon, Miller, for Improvements in Apparatus for Filtering Liquids.*—Sealed November 6, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Robert Beart, do hereby declare the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):—

My invention relates, first, to a mode of filtering liquids, by means of a piston having suitable filtering materials applied thereto, whereby the piston, in its movement, either produces a vacuum or partial vacuum, or creates a pressure so that the liquid is forced through the filtering material. The invention is particularly applicable for the making of infusions and decoctions of coffee, and of other matters, whether for culinary and chemical purposes, or for the arts, and for straining or filtering various fluids for the like purposes.

Description of the Drawing.

Fig. 1, represents a suitable vessel for making decoctions of coffee, or for other matters.

Fig. 2, is a piston shewn separately. *a*, is a piston consisting of a ring of metal or other suitable material, having a groove round its periphery to receive suitable packing, in order to its moving so closely as to produce the vacuum or partial vacuum required, within the vessel to which it is applied. *b*, is the filtering material, which may be jean, or closely woven cotton or woollen fabric, which is stretched over the piston. The edge or external rim of such filtering materials being turned over, leaving an enlarged edge in which a cord is run to form packing to enter the groove around the piston. The filtering medium applied to the piston may be of any suitable material depending on the liquid to be operated upon, and the degree of fineness desired to be obtained. *c*, is a handle applied to the two rods, *d, d*, which are affixed to the piston, and by which the piston may be raised. *e, e*, is a projecting rim affixed to the bottom of the vessel, in order that the person using the apparatus may place his feet on such rim when raising the piston with his hand, and thereby conveniently work it; or the piston may be worked by rack and pinion, or other convenient means; and in this mode the invention should be used when applied on a large scale. Supposing it be desired to make coffee by the aid of my invention, a small quantity of water is to be put into the vessel to fill up the space to which the piston does not descend; the piston is then to be put into the vessel and forced down as far as it will go, and, in all vessels which are to be put on the fire during the time the piston is in the vessel, there should be stops to prevent the piston going to the bottom, in order that there may be at all times a small quantity of fluid between the bottom of the vessel and the piston, to prevent the heat injuring the piston. The requisite quantity of ground coffee is to be put into the vessel, and a quantity of boiling water is to be poured thereon, and allowed to stand for a short time; the piston is then to be raised out of the vessel, by which means the liquor will be filtered and be very clear. Or in place of filtering immediately, the liquor may be boiled in the vessel, and then filtered by raising the piston; or the coffee may be made in a separate vessel and poured into the one containing the piston, for the purpose of filtering the same by drawing up the piston; thus it will be seen that the piston is at once the means of producing a partial vacuum, and of filtering the liquid submitted to it, aided by the pressure of the atmosphere. It will be evident that apparatus thus combined, having suitable filtering material may be applied to the filtering of various descriptions of liquids, and the apparatus may be varied so long as the vessel is suitably constructed for receiving a piston as herein described. And it will be further evident that in place of drawing up the piston when the liquid is desired to be filtered, the piston may be forced from the top downwards, by which the grounds of coffee or other matter contained and mixed with the liquid in the vessel will be carried down, and the liquid above the piston will be clear and well filtered.

Fig. 3, shews a section of another part of my invention, which consists of a vessel or apparatus for filtering coffee, in which arrangement there is a piston or filtering surface similar to that above described, placed very near the bottom of the vessel, leaving only a small space between the bottom of the vessel and the under surface of the filtering material. *f*, is a cock or tap for drawing off the coffee when required. It should be stated that the piston in this case may have a handle to quicken the process of filtration by raising the piston, but this is not absolutely necessary, so long as the parts are arranged properly for readily withdrawing the piston and filtering material for the purpose of cleansing the same. *g*, is a frame or stand for the coffee-pot or urn, which contains an iron heater by which the coffee may be kept heated. It should be understood that it is important that the piston and filtering apparatus (when the coffee-pot or urn is in use) should be low down in the vessel, in order that the same should be well covered with the liquid, that the atmospheric air may not pass down; and it is highly important that the space below the piston should be very small, in order to contain as little water as will prevent prejudicial effects of heat to the piston; and it is desirable that the opening of the cock into the vessel should be as low as possible, for it will be evident that if the space below the piston contained a considerable quantity of water, it would dilute and materially reduce the strength of the coffee first drawn off. In using this construction of coffee-pot or coffee-urn, the lower part of the pot is to be filled with boiling water; the filtering surface or piston is then to be lowered to its place, the proper quantity of ground coffee put into the vessel, and the requisite quantity of boiling water filled in. The coffee-pot or urn is then placed on its stand, and the same is allowed to stand for a few minutes, when the coffee may be drawn off by the cock or tap, and as the coffee is drawn off the pressure above will force the liquor through the filtering material.

The cover of the coffee-pot or urn is to have a hole as heretofore. It will be evident that in place of an iron-heater, a spirit-lamp may be used to these coffee-urns.

In making the pistons above explained, I prefer that on the upper surface there should be a perforated plate or plates of tin or other metals, and that the cotton or other material acting as the filtering material should be stretched over the same. I would remark, that I am aware that filtering apparatus have been heretofore so arranged, as, by means of pumps or other means, to withdraw the air, and thus to obtain a vacuum or partial vacuum below a surface of filtering medium affixed within the filtering vessel, and thus bringing the pressure of the atmosphere to aid in the process of filtration. I do not, therefore, claim the right as a new invention to bring into use the pressure of the atmosphere, where pumps or syringes, or other such means are used for withdrawing air from under the filtering medium in filtering vessels.

Having thus described the nature of my invention, I would have it understood that the apparatus may be varied according to the purpose to which it is to be applied, and I would have it understood that what I claim as my invention, is, first, the mode of filtering liquids by means of moving pistons, having suitable filtering materials applied thereto.

And, secondly, I claim the mode of applying filtering materials to coffee-pots or urns, from which the coffee is drawn by means of cocks or taps, and wherein it is not necessary, excepting for expedition, to cause the piston and filtering material to move, to perform the process of filtration.—In witness whereof, &c.

Enrolled May 3, 1839.

Specification of the Patent granted to James Timmins Chance, *of Birmingham, in the County of Warwick, Glass Manufacturer, for Improvements in the Manufacture of Glass.*—Sealed April 21, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said James Timmins Chance, do hereby declare that the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):

My invention relates, first, to a mode of smoothing and polishing thin sheet-glass, which will not allow of being ground away, in order to obtain the same in level

Fig 3

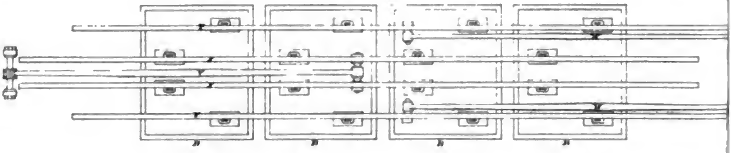


Fig 2

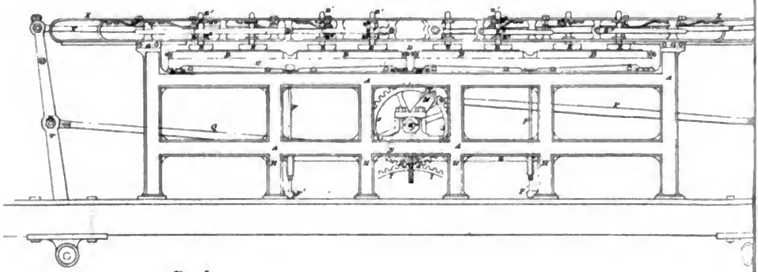
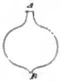


Fig 5



CHANCE'S

PATENT

Fig 4

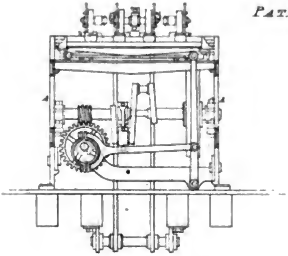
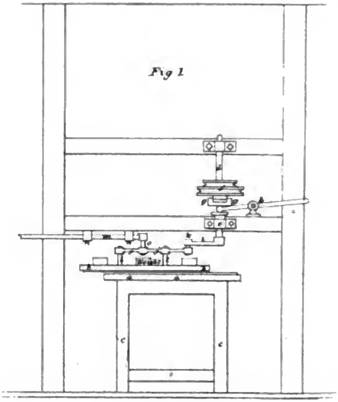


Fig 1



SUARCE & PONTIFEX'S PATENT

Fig 1

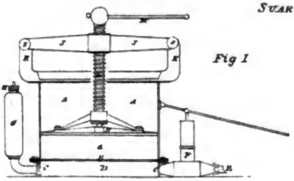
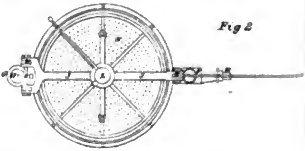


Fig 2



London Hodgson 112 Fleet Street August 1 1839

planes, as is the process of manufacturing plate-glass, which being cast or blown of considerable thickness, will allow of inequalities caused by concavities, and convexities, and bendings, or curvatures of the general substance, as well as other little irregularities of surface of a sheet of glass, being ground away in order to produce two level planes for surfaces, which are then smoothed and polished, as is well understood by plate-glass manufacturers. The object of my invention being to remove the irregularities of surface, without grinding away irregularities arising from any bendings or curves which may exist in the general substance of the glass, and thus I am enabled to smooth and polish thin sheet-glass, which will be found valuable for glazing of windows, engravings, and pictures, and other useful purposes, having an appearance in most cases equal to, and, for some purposes, such as glazing pictures and prints, in consequence of its thinness, even superior to the plate-glass now manufactured, at the same time avoiding the great weight which is necessarily given to plate-glass, in order that it may be of a degree of thickness which will allow of grinding away not only surface irregularities, but also curves, bends, and other inequalities, in the substance of the glass.

And secondly, my invention relates to an improvement in the manufacture of that description of glass called crown-glass. It is well known, that, in the manufacture of crown-glass, there is produced a thick ring or external boundary to the tables of crown glass, which not only materially adds to the weight of each table, but is in fact prejudicial to the appearance of the corner of a square of glass cut from a table, unless the ring or thick boundary of the table be removed and cut to waste. Now the object of the second part of my invention is to prevent or reduce the enlarged thickness of the boundary of the circumference of tables of crown-glass, in the process of making such description of glass.

Having thus generally pointed out the nature of my invention, I will proceed to explain the processes I pursue for carrying the same into practice. The kind of glass I prefer to operate on, according to the first part of my invention, is what is called German sheet-glass, which can be produced in large sheets, as is well known, and is made by blowing glass into hollow cylinders, and by cutting, in a line parallel with the axis, and by subsequent heat, each cylinder is laid open into a sheet, and is annealed; but such glass, by the act of its being laid into sheets, has certain irregularities of surface produced, which did not exist when in the form of cylinders. There are also other irregularities in the general substance of the glass, it at all times retaining more or less of a bended or curved substance, however carefully and repeatedly the flattening process may be performed, which bending of the substance of the glass will in many cases, in large sheets, be found to be equal (when the sheets are laid on truly plane surfaces) to, and, in some cases exceed, the thickness of the glass; consequently such glass would not allow of grinding away to obtain even planes, nor will such thin glass allow of grinding away of much of the substance when the bending, or curve, or such like irregularities, are to a much less degree than the thickness of the glass itself; and at the same time the thickness of such glass does not materially vary throughout a large sheet, but for practical purposes may be said to have parallel surfaces, when the small irregularities of surface, produced by bending a cylinder into a sheet, are not taken into consideration, which latter it is required to have removed in order to obtain good smooth polished surfaces to such glass, leaving the curves or bends which exist in the substance of the glass much the same as before undergoing the smoothing and polishing processes.

Description of the Process.

The first point to be obtained, in treating such glass, is to cause it to lie in a level plane, by taking advantage of its capability of being bent and laid even on level planes, as hereafter explained. I take a sheet of glass which has been flatted by the ordinary means, in order to get the same as even as possible, and diminished as to its original size no further than what is necessary to make its shape rectangular. This sheet is laid on a table or surface prepared as follows:—A slate, or other suitable surface, of about the same superficial dimensions as the glass, and about five-eighths of an inch thick, is mounted on a wooden frame, and is ground down to a level plane. The slate is then covered entirely with a piece of leather of uniform thickness, (or other suitable material,) previously soaked in water. The glass when laid on this level or plane surface, will seldom, if ever, lie flatly, so as to touch at all parts upon the table, but as the glass is flexible to a considerable extent, and may be readily bended, it is capable of being pressed down close to the damp bed or table by commencing pressure at one edge and passing over to the other, in a somewhat similar manner to the action used in pasting a sheet of paper on to a level surface; and all air being thereby driven from under and excluded from between the glass and the bed or table on which it is laid, the glass will be retained in this flat position by the weight of the superincumbent atmosphere, which for ordinary thicknesses and curvatures will be found sufficient to resist the elastic power which the glass possesses of resuming its natural form; and thus will a sheet of thin glass be obtained in a suitable plane for performing the process of smoothing and polishing, which is a mode of treatment very different to that employed in fixing, for grinding plate-glass, the grinding process applied to plate-glass being in fact for the purpose of obtaining a plane surface by grinding away the substance thereof; but when a plane surface of glass is obtained to the thin glass, as above described, and when a plane surface has been obtained, by grinding away the substance of plate-glass, the processes of smoothing and polishing are very similar for each description of glass, the variation of the processes being to accommodate them to the peculiar nature of the thin glass, and the mode of laying and holding the same in a plane surface whilst being acted on such plane surface, not being retained by the thin glass when removed from the table; whereas the plate-glass being ground away into plane surfaces, retains such planes, after taking them off the table where they have been operated on. The substances which I prefer to use for the purpose of smoothing are emeries of six or seven degrees of fineness, obtained by grinding emery stone, and separating the different kinds by washing with water, in the usual manner, or in place of the coarser emery very fine sand may be used. Two sheets of glass are laid flat on damp level beds, as above described, and one table rests stationary in a horizontal position on a fixed vertical frame, and the other one being carefully reversed, is laid glass against glass upon the other, and is then attached to the smoothing-machine, as will be hereafter more particularly described; or the two surfaces may be worked by hand labour.

In employing machinery for performing the process of smoothing, the arrangement should be such, that a line which bisects lengthways any horizontal section of the upper table, the centre of this line should be constrained to move in a straight line, while a point in the same line, at a certain distance from this centre, is made to describe a circle, the radius of such circle is arbitrary.

The machine being in motion, the workman commences with the coarsest emery-powder, or very fine sand; this he sprinkles on the lower glass, and assists its action by water. This operation is continued until both the glass surfaces in contact appear to be uniformly rubbed. The same process is repeated with each of the remaining emeries, which are used in the inverse order of their respective degrees of fineness. Each emery should be used until it has obliterated the scratches produced by the preceding one. The two sheets of glass are afterwards turned and relayed by taking advantage of the bending properties, and their remaining faces or surfaces are treated in the same manner. If any defects of surface are observable when the glass leaves the smoothing process, the workman is to rub them away by hand, using for this purpose the finest emery and a small piece of glass. In removing a sheet of glass from a table, one of two modes may be resorted to; first, by carefully lifting one edge and allowing the air to enter between the table and the sheet of glass, till the whole surface is removed from the table, thus taking advantage of the bending capabilities of the glass, or the sheet of glass may be slided off the table.

The Polishing Process.

A thin sheet of glass is laid, as before explained, on a table, covered with leather or other suitable material. The rubbers are prepared in the following manner: a piece of wood (about 8×3×1¾ inches) is covered on one face with felt; a liquid or paste is made by mixing crocus or the red oxide of iron with water; this paste is rubbed upon the felt, or thrown on to the glass, by means of a brush or otherwise, and the rubbers are made to produce an uniform polish over the glass by hand, or by means of machinery.

Description of the Drawings of Machinery for smoothing thin Sheets of Glass.

Fig. 1, represents a front view of a smoothing-machine. *a, a,* is a fixed horizontal table, having a sheet of thin glass laid on the upper surface thereof, as above explained; and *b, b,* is another table, having a sheet of glass laid on the under surface. The two surfaces of glass being parallel, owing to their being held in contact with two hard plane-surfaces of the tables, *a, b,* by taking advantage of the capability such thin glass has to bend, and to be laid even, and retained in contact with the planes of the tables by the weight of the atmosphere resisting the glass, assuming an irregular surface, when it has been once smoothly laid, and all the air driven out from between the glass and the table; hence the glass is at all parts kept in contact with the table, and parallel with it, thus producing suitable plane surfaces to be rubbed together in the process of smoothing, which would not be the case, if the ordinary means were resorted to for holding such thin sheets of glass, as are pursued in holding sheets of plate-glass, where level planes are obtained by grinding away the glass, and retaining such level planes, without reference to the bed on which the glass is laid. *b, b,* is the framing of the machine, which should be strong and without vibration. *c, c,* are the legs of a platform on which the stationary table, *a,* is supported. *d,* is an upright axis, turning in suitable bearings or brasses at *e, e*; and *f, f,* are pulleys for an endless-band, from a steam-engine or other power, to give rotatory motion to the axis, *d,* such pulleys being placed on the axis, *d*; and *g,* is a clutch-box, capable of sliding on the axis, *d,* on a feather, as is well understood; *h,* being a lever by which a workman can put the clutch-box into or out of connection with the pulleys, and, consequently, start or stop the machine. On the lower end of the axis, *d,* is affixed a crank, *i,* as is shewn in the drawing. *j,* is a bar, having four openings; in the first opening is placed the crank-pin, *k,* by which the movement of the crank is connected with the bar, *j*; but such movement of the bar is controlled in the following manner: *l, l,* are two uprights affixed to the framing of the upper table, *b,* which enter two of the holes or openings in the bar, *j,* the bar being affixed to those uprights by set screws, as shewn, or otherwise. *m,* is a bar which moves in bearings or guides, *n, n*; and, by such guides, are controlled to move in a right line. *o,* is an axis descending from the bar, *m,* and enters the bar, *j,* and allows of the bar, *j*, turning on that axis; hence in the revolution of the crank, *i*, the bar, *j*, is moved also; but the movement of the bar, *j*, is thus regulated and controlled by the axis, *o*, which is in the centre of the upper table, moving at all times to and fro on a right line: by this means a compound movement will be obtained to the upper sheet of glass, compounded of the revolving motion of the crank and the right-line movement of the axis, *o*, about which the sheet of glass turns, as will be evident on examination of the drawing.

Description of the Machinery employed in Polishing.

Fig. 2, shews an elevation of a machine for polishing sheets of thin glass, the machine being arranged for operating on four tables at the same time, and the rubbing surfaces or polishing instruments are so arranged as to move in opposite directions, in order that any tendency which might be produced to slide the glass on the tables by one set of rubbing-surfaces, may be counteracted by the tendency of another set of rubbing-surfaces moving in an opposite direction; and in addition to the two and fro movement of the rubbing-surfaces, there is a movement communicated to the tables in a direction at right angles to the movement of the rubbing-surfaces or polishing-instruments.

Fig. 3, is a plan of the polishing-machine.

Fig. 4, a transverse section thereof. In each of these figures the same letters are employed to indicate similar parts; A, A, being the framing of the machine, and B, B, B, B, are the tables on which the glass is laid and kept even, as before explained. These tables are carried by two rectangular frames, C, and affixed therein by means of set screws, D, as is clearly shewn in the drawing. The frames, C, are capable of moving to and fro in the dovetail grooves formed in the guides, E, which are carried by the framing of the machine, such dove-tail grooves having filling-pieces capable of being set up by screws, as is shewn;

hence the dovetail projections on the underside of the frames, c, work correctly in the grooves of the guides, and are retained in those guides by the filling-pieces. F, F, are connecting-rods, which are connected to the frames, c, by pin-joints as is shewn by dotted lines, the other ends of such connecting-rods move on axes, at F^1, and have collars or straps which embrace eccentrics affixed on the shaft, G, as is clearly shewn, the shaft, G, turning in suitable bearings, at H, carried by the framing of the machine; hence when the shaft, G, receives rotatory motion, as hereafter described, motion is communicated to the tables, c; and motion is communicated to the machine in the following manner: I, is a wheel only partly shewn in the drawing, which is driven by a steam-engine or other power. The wheel, I, taking into the wheel, J, gives rotatory motion thereto. The wheel, J, being affixed on the axis, K, there being a worm or screw affixed on the axis, K, which drives the wheel, L, affixed on the shaft, G; thus is motion obtained to the shaft, G, and from it to the tables, c, on the axis, K, are formed two cranks, M, N, which, by means of connecting-rods, P, Q, give motion to two rocking-levers, R, there being two levers, R, at each end of the machine combined together by screw-bolts, T. From the upper parts of the rocking-levers, R, proceed connecting-rods, V and W, W, such connecting-rods being attached by pin-joints to the frames, X, Y, which carry the polishing-surfaces, Z. The frames, X, Y, being carried in guides, *a*, which retain them upright. The polishing-surfaces, Z, are applied to the frames, X, Y, in the following manner: Z, are projecting-rods from the tops of the polishing instruments which pass through guides, Z^2, in the frames, there being a set-screw to each rubber, in order to retain it up from the glass when desired, such set-screw passing through one of the guides, Z^2, as shewn. In each of the bars, Z^1, is a projecting-stud, which is pressed on by a lever, Z^3, having its axis on a polishing-frame, such lever being borne upon by a spring, z^4, which is affixed to the frames, X or Y, one spring to each polishing instrument; and there is a set-screw passed through each spring, by which the degree of pressure is regulated.

The machine, when set to work, will evidently cause the polishing instruments, Z, carried by the frame, X, to move at all times in an opposite direction to the polishing instruments on the frames, Y, which is important, where the glass is held level, according to the means above described. In working this machine, the workman puts on the polish-mixture from time to time, by a brush or otherwise.

Having thus described the nature of my invention, and the manner in which the same is to be performed, I would remark, that I make no claim to any of the parts of the machinery, or the combinations thereof, which have been before used, either for the polishing of glass or other purposes. And I am aware that attempts have been made to grind smooth and polish squares of small sheets of thin glass, by pursuing like means to those resorted to for grinding, smoothing, and polishing plate-glass, but, I believe, without success. I do not claim the grinding, smoothing, and polishing thin glass generally, but only a mode of doing so, as herein described.

I will now proceed to explain the mode of preventing or reducing the enlarged external edge or boundary of tables of crown-glass. In making crown-glass, as is well understood, a solid mass of metal (melted glass) having been collected at the end of a hollow pipe, as shewn at fig. 5, is expanded, by the operations of "marvering" (or rolling on a flat metallic slab,) blowing, and heating into a hollow spheroidal globe, which is joined to the pipe by a hollow cylindrical piece of metal, (A,) termed the neck. The globe being completed, a rod, named a punt, is attached to the bullion or part, (B,) of the globe, which is exactly opposite to its neck; and this neck being broken transversely, in order to disengage the pipe, a circular aperture is left of about two to three inches diameter. The hollow globe of metal is then exposed to the flames of an open fire, and the punt which holds it being twirled or revolved round in the workman's hand, as is well understood, the globe is spread by centrifugal force, and a table or circular plate is produced, the neck forming the periphery or external boundary or ring of the table. Now, the thickness of the salvage is generally much greater than that of the rest of the table, except the bull's eye, or central portion, and the adjacent parts, a circumstance which both increases the cost and diminishes the value of the glass, the thickness of this salvage depends on the diameter and substance of the neck, and varies as they vary. The nature of my improvement consists in the reduction of the thickness of the said salvage, by diminishing with much greater certainty than can be attained by the present modes, both the diameter and substance of the neck; and this latter diminution is effected by the simple contrivance of turning, or rolling the neck, while in a hot ductile state, on a wooden bar or surface. Having selected a piece of soft wood, such as that of the pear-tree, I cause a bar to be cut from it about six feet long, six inches wide, and one inch thick. And on one edge of this bar are cut, transversely to its length, small grooves (to receive the necks), at convenient intervals, about two inches wide by three quarters of an inch in depth. This bar is placed with one face close against that edge of the blowers, "marver," which is furthest from and opposite to the workman, the groved edge being uppermost, and about three inches above the top of the marver; and it is fixed in this position horizontally in such a manner, that one end of the bar is moveable on an axis, while the other end rests on a pin, which may be removed and replaced at pleasure. Suppose, then, that the blower is about marvering a globe; before the process, the boy, who attends on purpose, removes the pin, and allows the bar to drop below the marver; but when the blower has finished the marvering, the boy raises the bar into a horizontal position, and replaces the pin beneath it; and the blower having placed the neck of the globe on one of the aforesaid grooves, turns it round in the same, and continues blowing, until both the diameter and substance of the neck appears to be sufficiently reduced, which the workman, with a little practice, will readily judge of; the boy then drops the bar; and the boy, during the interval between two operations, ought to wipe the marver clean from the small particles which escape from the wood; and also keep the edge of the bar moistened by a wet sponge.—In witness whereof, &c.

Enrolled October 20, 1838.

Specification of the Patent granted to CHARLES GABRIEL BARON DE SUARCE, *of Red Lion Square, Middlesex, Colonel in the French Service, and* WILLIAM PONTIFEX, *of Shoe Lane, in the City of London, Coppersmith, for an Invention of a New Mode of Obtaining Dyes, Colours, Tanning, and Acids from Vegetable Substances.*—Sealed February 11, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c., *Now know ye,* that in compliance with the said proviso, we, the said Charles Gabriel Baron de Suarce, and William Pontifex, do hereby declare the nature of our said invention to consist in obtaining vegetable extracts by placing the matter from which the extract is to be obtained in a ground or finely subdivided state, into a vessel or apparatus of the kind hereinafter described, and forcing water or other fluids at different temperatures, according to the extract required, through the said matter, by a force-pump, or other similar power; and in further compliance with the said proviso, we, the said Charles Gabriel Baron de Suarce and William Pontifex, do hereby describe the manner in which our said invention is to be performed by the following statement thereof, reference being had to the drawing annexed (that is to say):—

Description of the Drawing.

A, A, A, represents a cylindrical vessel with a false bottom, B, which false bottom should be perforated over its whole surface with holes like a colander. This false bottom forms a chamber, C, D, separate from the chamber, A, A, A. At the end of C, of the chamber, C, D, is received water, or other fluid, as the case may be, from F, which is an ordinary force-pump, E, being the feed-pipe, leading from the reservoir containing the water or other fluid to be used. G, is an air-vessel with a safety-valve, H, the former to keep up an equal and constant flow of water, or other fluid, from the force-pump, and the latter to regulate the amount of pressure given to it. J, J, is a cross-beam or bridge, supported on the brackets, K, K, and held in its place by bolts at S, S. Through this bridge passes the press-screw, L, turned by the hands, M. This screw acts upon a cover or plate, N, which is also perforated like a colander, and is placed on the top of the matter from which the extract is to be obtained. When the extract is to be made, the following directions should be attended to. For the purposes of this explanation we will suppose logwood to be the matter to be acted upon, and the logwood dye to be the extract sought to be obtained; the chambers, A, A, A, and C, D, being perfectly empty and clean, we take out the bolts, S, S, and remove the cover, N, and screw, L, bridge and all. We then take a quantity of ground logwood, or saw-dust made from logwood, and place it in the chamber, A, A, A, upon the false bottom, B, packing or pressing it down firmly by the hand till the chamber, A, A, A, is filled to about the height at which the cover, N, stands, as shewn in the drawing. We then replace the cover, N, screw, L, and bridge, J, J, putting in the bolts, S, S, to keep all firmly to their places. We then, by means of the screw-lever, M, give a slight pressure upon the ground logwood beneath it, and leaving it under that pressure, commence pumping clean water, raised to a temperature of about 160° Fahrenheit into the chamber, C, D, by means of the force-pump, F, which causes the water to rise up through the ground logwood, and thus fills the upper part of the chamber, A, A, A, with logwood dye, or extract.

Fig. 2, is a plan of fig. 1.

Now whereas it is evident that extracts may be made from any suitable vegetable matter, placed in an apparatus of this kind, in the finely subdivided state hereinbefore mentioned, by forcing liquids through it in a manner aforesaid, at such temperatures as experience may shew to be best adapted for each particular extract; and whereas the liquid used may be clean water, or any other more suitable fluid, or mixture of fluids, dependent on the nature of the extract required to be obtained by this process; and whereas we claim as our invention the mode hereinbefore described of obtaining dyes, colours, tanning, and acids from vegetable substances; and such our invention being, to the best of our knowledge and belief, entirely new, and never before used within that part of Her Majesty's United Kingdom of Great Britain and Ireland called England, Wales, and the Town of Berwick-upon-Tweed, and in all Her Majesty's colonies and plantations abroad, we do hereby declare this to be our specification of the same, and that we do verily believe this our said specification doth comply in all respects, fully and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained; wherefore we do hereby claim to maintain exclusive right and privilege to our said invention.—In witness whereof, &c.

Enrolled June 1, 1839.

Specification of the Patent granted to EDWARD SAMUEL, *of Liverpool, Merchant, for Improvements in the Manufacture of Soda.*—Sealed November 13, 1838.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said Edward Samuel, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say):—

My invention relates to certain modes or processes applicable to the manufacture of soda, which I will proceed to describe. First, I take of sulphate of barytes any convenient quantity, say 116 parts, and of coal or coke about forty parts; having mixed these together I roast them at a red heat for some hours in a brick or iron retort, or in a kiln, until the sulphate of barytes becomes converted into a sulphuret of barium, which is the case so soon as the contents of the retort or kiln are found to be soluble in water. The quantity of sulphuret of barium which should be obtained from the 116 parts of barytes are eighty-four parts. I take from the retort or kiln, the eighty-four parts of sulphuret of barium, and dissolve them in hot water. I dissolve in a separate pan seventy-two parts of sulphate of soda, to which I then add the solution of the sulphuret of barium; a decomposition takes place, sulphate of barytes is precipitated, and a hydro-sulphuret of soda remains in solution. I draw off into another vessel the hydro-sulphuret of soda, and pass through it streams of carbonic acid gas, until the whole of the solution is saturated. I evaporate to dryness the saturated solution of soda, and I then have the common sub-carbonate of commerce. The carbonic-acid gas may be obtained by pouring muriatic-acid gas upon carbonate of lime, or by any other convenient method. What I claim in the above detailed process is adding sulphuret of barium to sulphate of soda, for the purpose of obtaining mutual decomposition. I also claim the passing of streams of carbonic-acid gas through a solution of sulphuret of sodium or hydro-sulphuret of soda obtained through the medium of decomposition by sulphuret of barium.

I will now describe my second method of obtaining the hydro-sulphuret of soda, which is as follows: I take of sulphate of strontites any convenient quantity, say ninety-six parts, which I mix with about thirty parts of coal or coke, and roast them together at a red heat in a brick or iron retort or kiln, until the sulphate of strontites becomes converted into a sulphuret of strontium, which is the case as soon as the contents of the retort or kiln are soluble in water. The quantity of sulphuret of strontium which should be obtained from the ninety-six parts of strontites are sixty parts. I take from the retort or kiln the sixty parts of sulphuret of strontium, and dissolve them in hot water. I then dissolve in a separate pan seventy-two parts of sulphate of soda, to which solution I add the solution of sulphuret of strontium; a decomposition takes place, sulphate of strontites is precipitated, and hydro-sulphuret of soda remains in solution. I draw off into another vessel the hydro-sulphuret of soda, and pass through it streams of carbonic-acid gas, until the whole of the solution is saturated. I evaporate to dryness the saturated solution of soda, and I then have the common sub-carbonate of soda of commerce. What I claim in the above process is adding sulphuret of strontium to sulphate of soda for the purpose of obtaining mutual decomposition. I also claim the passing of streams of carbonic-acid gas through a solution of sulphuret of sodium or hydro-sulphuret of soda, obtained through the medium of decomposition by sulphuret of strontium.

I will now proceed to describe the third part of my invention. I decompose sulphate of soda by means of the hydrates of barytes and strontites, obtained by boiling any metallic oxide with the sulphurets of strontium or barium. I prefer oxide of copper, of which I use thirty-one parts to eighty-four of sulphuret of barium, or to sixty of sulphuret of strontium. I then pursue the same plan with the remaining solution as if I used the sulphurets of barium or strontium, until I obtain the sub-carbonate of soda, and which methods are fully detailed above. What I claim as the third part of my invention, is adding as above the hydrates of barytes or strontites to sulphate of soda, for the purpose of obtaining mutual decomposition. I also claim the passing of streams of carbonic-acid gas through an hydrate of soda obtained through the medium of decomposition by the means of such hydrate of barytes or strontites.

The fourth part of my invention consists in the decomposition of chloride of sodium by oxalic-acid. For this purpose I mix together a saturated solution of common salt, with a saturated solution of oxalic-acid. The result of this is that the greater part of the soda is thrown down as an oxalate or a binoxalate of soda. The liquid being poured off, I either expose the binoxalate or oxalate of soda so obtained to a red heat by which it is at once converted into carbonate of soda; or else I mix it with a sufficient quantity of carbonate of lime and water, and boil the mixture, by which operation I have a solution of carbonate or bicarbonate of soda, and an insoluble precipitate of oxalate of lime. The solution is salted down, and being heated in a furnace, becomes carbonate of soda. The oxalate of lime is to be decomposed with sulphuric acid, and the resulting oxalic-acid used for another operation. What I claim in respect to this part of my invention, is the use of oxalic-acid for the purpose of separating soda from chloride of sodium or common salt.—In witness whereof, &c.

Enrolled May 13, 1839.

Specification of the Patent granted to Richard Goodwin, *of Saint Paul's Terrace, Camden Town, in the County of Middlesex, Coal Merchant, for an Improved Prepared Fuel.*—Sealed April 26, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Richard Goodwin, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following description thereof (that is to say):—

My invention of an improved prepared fuel consists in mixing or combining certain materials (which in themselves are nearly useless) in various proportions, so as to produce, when combined, a cheap and good fuel. The composition consists of the under mentioned articles, and is combined in the following proportions. Seven parts of fuller's-earth, or strong blue clay or loam, such as is or may be found in abundance in the neighbourhood of London, or the sediment mud or loamy earth from the banks or bottoms of rivers, canals, moats, or ponds; two parts of coal-tar, or pitch, or Stockholm tar; eight parts of small bituminous coal, such as will pass through a quarter-inch sieve (and which of itself is comparatively of no use for domestic purposes), three parts of mire, mud, or scrapings, from the public highway roads, whether macadamized or paved as in London. In combining these ingredients I use the following method:—First, I make a layer of fuller's-earth, blue clay, or loam, or the sediment mud or loamy earth from the banks or bottom of a river, canal, moat or pond. I then take one of the two parts of coal-tar, pitch, or Stockholm tar, and make a layer of it by pouring it on the before-named seven parts of fuller's-earth or clay, after which I take the eight parts of small coal, with which I make a layer upon the former.

I then make another layer, consisting of the mud, mire, or scrapings of the public highway roads, and add lastly the remaining one-part of coal-tar, pitch, or Stockholm tar. If the mud, mire, or scrapings be in a fluid state, it will most probably contain sufficient water for the perfect mixing of the whole, but if nearly dry, a sufficient quantity of water must be applied to cause the whole of the materials to amalgamate. I then have the whole turned over with a shovel, or other suitable instrument, and thus mixed; and afterwards, for the more perfect incorporation of each component part with the other, I grind the whole in a mill actuated by horse, steam, or other power, the mill being constructed on a similar principle to those used for grinding or mixing brick-earth or mortar. The whole being thus thoroughly compounded and reduced to about the consistency of clay prepared for tile making, it may be formed or made into any convenient shape by the hand or in a mould, and afterwards dried in the same manner as bricks, and when hard the fuel will be fit for use. I would here notice that when the fuel is about half dry, it is susceptible of compression, and may be reduced from the original size full one sixth or more, still retaining its full strength as a fuel, which I belielve to be equal to that of Merthyr coal, and spreading in its flame to that of Hartley main. And consequently it presents to the steam-navigator most incalculable advantages in the saving of stowage to the extent of at least one-third. I use the fuller's-earth, blue clay, or other such earthy materials as before named, for binding or holding the other matters together. I most distinctly claim the use of road mud, mire, or scrapings of the highway roads or streets, as applied to the manufacture of fuel, as my invention or discovery, and consider the use of the same as a component of fuel as an invaluable discovery, inasmuch as the said mire or mud is in itself inflammable and combustible, as it contains iron and steel in very small and innumerable particles which is perpetually being chafed from the shoes and shoe nails of horses, and from the tires of carriages of every description; this brought into collision with flint-stone (with which also this mud or mire abounds) of themselves produce fire. And the mineral and vegetable parts and qualities of this part of my improved fuel, I consider to be in their very finest state of applicability for burning purposes, not having been washed of their native strength in the common sewers, nor finally deposited in the river, where it becomes mud necessarily exhausted of its greatest strength and finest qualities by the flowing and ebbing tides, and constantly in an almost state of inundation, which is well known to be ruinous to the very best and strongest coal produced in the kingdom. The coal I use being all small is with a view to its entire incorporation with the other materials, and to bring it into the most important use in giving or imparting to the fuller's-earth, clay, or loam, a mouldering tendency reducing it to ashes. The unctuous qualities of tar or pitch are so great that in being well mixed with fuller's-earth, clay, or loam, it becomes, when lighted, a kind of cemented body of fire, and in like manner also diffuses its bituminous power into the mire or mud. The qualities of the road or highway mud, or mire, are peculiar and most important; first it gives to the fuller's-earth, clay, or loam, an additional readiness for crumbling into ashes when submitted to the action of fire instead of its forming a hard substance or kind of stone or brick in the fire; the grit of stone and sand in the mud or mire occasions this, in a great degree, loosening or separating the glutinous or binding qualities of the fuller's-earth, clay, or loam; also the pulverized iron and steel it contains, gives to this fuel an intensity of heat which I believe is not found in any coal. The vegetable matter this mud or mire also contains, such as corn, clover, hay, and straw, after the partial decomposition it undergoes before it forms a part with the other numerous ingredients, vegetable and mineral (found in road-mud or mire), added to the well known bituminous properties of tar, pitch, and coal, produce a superior and economical fuel for all domestic purposes, and in a furnace is quite equal in extent of spreading flame to Hartley Main Coal.

In conclusion, I wish it to be understood that I do not claim the exclusive right to use any of the above named materials (except the road-mud or mire) separately; nor do I confine myself to the precise proportions of each or either article, herein mentioned, as they may be, under circumstances, varied. But that which I claim as my invention, is, first, the applying of road-mud or mire, for the manufacture of an improved fuel.

Secondly, the combining of the above mentioned materials therewith, they, viz., strong blue-clay, &c., coal-tar, and small coal, being the refuse of their respective kinds, in the above-mentioned proportions, or nearly, or whereby the same may be applied to important uses as a substitute for ordinary fuel, both for domestic purposes and the more important use of generating steam in steam-boilers, for the furtherance of steam-navigation, in both which uses I effect a saving of at least one-third in the room required for stowage, and also in the expense of ordinary fuel.—In witness whereof, &c.

Enrolled October 26, 1838.

LAW REPORTS OF PATENT CASES.

Judicial Committee of the Privy Council.

(*Before* Lord Brougham, Lord Lyndhurst, Sir Robert Jenner, and Sir S. Lushington.)

Downton's Patent.

Mr. Hill said this was a petition, praying for an extension of a patent, granted on the 18th of June, 1825, for an article of great utility, and of a perfectly new construction—a water-closet adapted for ships, steam vessels, &c. The inventor, Mr. Jonathan Downton, was a shipwright, who had shewn great ingenuity in this and other mechanical inventions; but owing to want of capital he had been unable to bring it into such general use before his death (which happened in January, 1836) as to afford him a fair remuneration for the expense and labour he had bestowed upon it. It would be proved that the article was now in extensive use, and was universally approved of, being put into all the government vessels, steam-boats, &c.; and the best proof of its utility was, that it had given rise to several imitations, none of which was found to answer the purpose of this invention. The present petitioner was the widow of the patentee, who had been left with a family of ten children, and the profits which might reasonably be expected to arise from the sale of this article, now that it was getting into such general demand, were of great importance to them.

Lord Brougham asked if the petition was opposed?

Mr. Wakefield said he appeared for Messrs. Johnson, of Limehouse, who had entered a caveat.

Lord Brougham.—Do you say that the patent is invalid—that the invention was not new or useful, or that they have made profit enough?

Mr. Wakefield.—No; we say that they have never been able to work the patent.

Mr. W. Carpmael, Civil Engineer, said the invention consisted in applying a force pump and certain valves and apparatus to the ordinary pan, &c., which made it peculiarly applicable to ships, particularly in cases where they are required to be below the water line; for such was the arrangement of the valves, that the greater the pressure of water from the outside towards the inside of the ship, the greater safety would there be from the valves being kept closed and water-tight, which was of the greatest consequence where it was below the line of floatation. The invention was quite new, and was one of great utility. It had been very extensively used in ships, and the demand for it was increasing.

Cross-examined.—A lift-pump may be similarly used, but not with such safety, in consequenceof there being a valve in the piston of lift-pumps.

In answer to questions by their lordships, the witness said he had known the inventor some years, and he was an exceedingly ingenious and industrious man. He had made several other inventions, but the witness had dissuaded him from pursuing them, knowing that he had not the means to work them efficiently.

Mr. Oliver Laing, Master Shipwright, in the dockyard at Woolwich, stated that the articles had been used for twelve years in all the government ships, steam-boats, &c., and still continued to be so, having been found greatly approved of.

Mr. Barclay, Civil Engineer, also spoke to its general use in steam-vessels, &c.

Mr. Jonathan Downton, son of the patentee, said his father had spent about 500*l.* in taking out the patent, and bringing it into use, and although the demand for it had gone on increasing, he had died insolvent.

Mr. Leary, an Accountant, produced from the patentee's books a statement of the number of articles made since the date of the patent, which appeared to be 924.

Mr. J. H. Nairne, Brass Founder, said he had supplied the patentee with the metal used in the machine, and was his largest creditor at the time of his insolvency, upon which he received a dividend of eight shillings in the pound upon 1173*l.* I conscientiously believe he paid me as much as he could, in consequence of the vast outgoings he had been at in bringing out this patent; he was as honest and industrious a man as ever existed.

Lord Brougham.—So that though you lost 12*s.* in the pound you feel no revenge?—Witness. Not the least; I am perfectly satisfied; I know his intentions were honest. He was a man who had raised himself wholly by his industry.

Mr. Wakefield.—Should you not have been better satisfied if he had given his creditors the patent?—Witness. No, I should not have been satisfied to take it from him, with his large family; I could not have asked such a thing.

Lord Brougham observed that the witness's testimony, in point of feeling, did him great honour.

Mr. Wakefield addressed their lordships on the part of Messrs. Johnson, and denied that those gentleman had been actuated by any unfair motive.

Lord Lyndhurst said their lordships were of opinion that the term of the patent ought to be extended for five years, and as they thought the opposition was unnecessary, they should direct Messrs. Johnson to pay the petitioners the costs of it.

Westminster Hall. Wednesday, 12th of June 1839.

(*Before the Master of the Rolls.*)

WESTHEAD *v.* KEENE.

Motion for Injunction.

Mr. Pemberton.—If your lordship pleases, in a cause in which Joshua Procter Westhead, is the plaintiff, and Charles Keene, Christopher Nickels, and the London Caoutchouc Company, are the defendants, I am humbly to move, your lordship, that the defendants, Charles Keene, and Christopher Nickels, may be restrained by the order and injunction of this honourable court, from making or using an invention described in the plaintiffs patent. My lord, this is a case which has been before your lordship upon demurrer some time ago; your lordship overruled the demurrer, and we have now got the matter before the court for an injunction which is supported by affidavits. The plaintiff is Joshua Procter Westhead; and the defendants are Charles Keene, and Christopher Nickels, the parties against whom the injunction is sought, and the London Caoutchouc Company, who contracted with the plaintiff for the purchase of the invention; and who are, of course, materially interested in the question before the court. My lord, the bill states that on the 16th of February, 1836, the plaintiff, Joshua Procter Westhead, obtained the letters patent for an improved method of cutting caoutchouc, or India-rubber, leather hides, and similar substances, so as to render them applicable to various useful purposes. My lord, I believe I had better state generally what is the nature of the invention. The object of the invention is, for an improved method of cutting caoutchouc, which may be cut into sorts of ribands, which is done in a peculiar method; a method wholly unknown to be applied to the purposes of the present invention. The old method of cutting it, was by having it in bottles, and then it was cut in a spiral form in the ordinary mode, which answered the purpose; but solid or irregular pieces of India-rubber could not be cut in that mode. The invention of the plaintiff has been used for the refuse of the India-rubber; it is now pressed down and consolidated into a disc, and by means of a machine it is cut into bands or thongs; the consequence of which is, that the bands or thongs of any length may be cut from that sort of India-rubber, which before was merely refuse and wholly worthless. My lord, the defendants put in a demurrer, and upon the demurrer coming on, it was argued that the patent was invalid upon the face of it. It was said the description of a patent for an improved method of cutting caoutchouc, or other similar substances, so as to render them applicable for various useful purposes, was an improper description, and the specification did not remove the difficulty which was supposed to exist from the too great distension of the patent; your lordship was of opinion it was impossible to decide that it was not right, and your lordship overruled the demurrer, and the parties are proceeding now upon the affidavits. My lord, my objections are partly objections of law, and partly objections of fact; and I apprehend, probably your lordship will be of opinion that all that can be done at present, will be to direct an action to be brought. I do not imagine that the court will dispose of it without an action, but we hope in the mean time, an injunction will be granted, and these parties it appears ought not to be permitted to go on using this invention in the mean time. If your lordship should say it is not a cause in which, considering the delay which has taken place, the court ought to interfere by way of injunction; perhaps your lordship will put the parties upon terms. My lord, the first affidavit filed in support of the motion, was an affidavit filed on the 6th of December 1838; it is the affidavit of Mr. Westhead himself, and he states that letters patent were granted to the effect I have stated to your lordship, that he duly enrolled the specification within the six months, and that the specification is in the form mentioned. Perhaps your lordship will allow me to hand up this drawing to your lordship, and you will then see the specification. Now, my lord, as your lordship sees in fig. 2, s, is the disc of the India-rubber; then there is above, a G, a red line which is the circular cutting line; the principle of the machine is that when this winch, or whatever it is called, at the end the machine, is turned, the knife revolves and then the

India-rubber is gradually approximated to the knife which cuts the India-rubber, the India-rubber turns round.

The Master of the Rolls.—I see the whole at once; it is quite obvious how it is.

Mr. Pemberton.—Your lordship, I dare say, is familiar with it; there is a lateral motion which keeps it up to the knife, and the knife itself turns, which cuts the India-rubber.

Mr. Tinney.—The India-rubber revolving assists the cutting.

Mr. Pemberton.—It keeps it up to the knife; there are three motions by which this solid piece is cut.

The Master of the Rolls.—Are you for the defendants, Mr. Tinney?

Mr. Tinney.—Yes, my lord.

The Master of the Rolls.—You say the patent was clearly bad; there ought to be no intervention at all, and, therefore, you decline keeping an account?

Mr. Tinney.—Oh, yes, my lord, we don't use this invention.

Mr. Pemberton.—If they do not, we shall fail at law. My lord, that is the question which will have to be tried at law. And then, my lord, Westhead, in his affidavit, says, "That in the latter part of the month of July, or the beginning of the month of August, 1838, he was, for the first time, informed by Robert William Sievier, of Henrietta-street, Cavendish-square, that the defendants, Charles Keene and Christopher Nickels, were infringing his patent rights; until which time he did not know that the defendants or either of them were infringing his patent rights, and deponent believes, that by such infringement, the defendants have made considerable profits, to the manifest and serious injury of the deponent." Then, my lord, there is the affidavit of Edward Woodcock, a mechanist, who was formerly in the employ of the defendants, Messrs. Keene and Nickels; and he says, he has for the last twelve years, been engaged in mechanical pursuits, and is well acquainted with the science or business of a mechanist. That after the grant of the letters patent, and in March 1836, deponent, with the assistance of one Benjamin Nickels (a brother to the defendant, Christopher Nickels), manufactured, or assisted in manufacturing, by order of Charles Keene and Christopher Nickels, for the use of the firm, a machine, varying in some immaterial particulars and details, but otherwise precisely the same in principle, construction, mode of use, and operation, as the machine invented and constructed by the plaintiff, Westhead. Now, my lord, I believe the only difference between the two is the mode in which the disc is placed: in the one case it is horizontal, and in the other it is at right angles; it is precisely the same in every other respect, the motion is the same, the lateral motion is the same, and the rotatory motion is the same; the only diference is, that the one is laid flat and the other round. Our letters patent were in February; and after this is done the first thing is, that in March it is imitated in the manner I have described to your lordship. Now, these affidavits were filed in support of the motion originally; and instead of meeting the motion on those affidavits (which, to be sure, might have been done at once in a more satisfactory manner, if they say they have not infringed the patent) they filed a demurrer to the bill while the notice of motion was pending.

Mr. Tinney.—No, you are under a mistake; the notice of motion was given on the 8th of December, and the demurrer was argued on the 3rd of December.

The Master of the Rolls.—The notice of motion is dated the 7th of December.

Mr. Tinney.—Yes, my lord, and the demurrer was argued and overruled on the 3rd.

Mr. Pemberton.—The notice of motion was served on the 8th. It does not in the least degree affect the propriety of the proceedings. Why file a demurrer to the bill to put us to all the expense of the demurrer, and to put the court to the trouble of being occupied a day and a half on a long discussion on the merits of the invention? if the gentlemen are really justified in saying what they now say, that they had not for nine months before used our invention. Mr. Tinney says they are not to keep an account, because they do not use our invention: it is the shortest possible answer to it;—why file a demurrer? Instead of taking the course of meeting it upon the affidavits, they demurred; they put us to the expense of arguing the demurrer, and afterwards (the demurrer being overruled) they filed affidavits in answer to our application; and the first affidavit which I have got is the affidavit of Mr. Christopher Nickels, the defendant; and my lord, no doubt Mr. Nickels, the defendant, in many respects contradicts the affidavit of Woodcock, and the question is whether that is not a matter which must be tried at law. The defendant, Nickels, cannot be examined, but Woodcock will be put into the box, and will be examined and cross-examined, no doubt, very strongly; but to say that Mr. Nickels is to avail himself of his own evidence in a court of equity, when he could not do so in a court of law, is going rather too far. He says, "he hath perused the affidavit of Woodcock sworn on the 20th of November, and he says he never was employed in the elastic department of the business.;" (what is meant by that, I do not know;) "but only in the grinding and re-composing of India-rubber in blocks for the use of stationers, and for sheet India-rubber, and other purposes," &c. &c. (affidavit read down to the words) "and other copies of which work deponent hath been informed and believes have been supplied to other persons in this country in the course of the years 1834 and 1835." The effect of this affidavit is to say, as I understand it, that the description of the French work, published in the year 1834, contains an account of an invention similar to that for which the plaintiff has obtained his patent.

He then says, "that on deponent's reading the said printed copy of plaintiff's specification, he was unable to make out what the distinction, novelty, or improvement was sought to be protected by the patent, inasmuch as it set forth no other species of machinery than had been used in separate parts, or with some immaterial modification by deponent and others in the manufactory for cutting India-rubber only, and not leather hides, or other similar substances. That it hath been the habit of this deponent and his partner to keep a large stock of raw material, or unmanufactured India-rubber, in their factory ready for consumption; and that in point of fact, at the last mentioned period, they had an average stock thereof for two years consumption; and that at the present time they have, to the best of deponent's belief, a stock of India-rubber enough for four years consumption."

Mr. Pemberton.—My lord, this is the drawing of the machine used by she defendants.

The Master of the Rolls.—This is an old machine.

Mr. Pemberton.—It is what they call an old machine; that is the question to be tried.

Mr. Tinney.—It is the machine they have always used until they found out the other.

The Master of the Rolls.—By this it is the machine and the knife are revolving in planes one with the other, to keep up the disc with the knife.

Mr. Pemberton.—The question is as to the truth of this; here is their statement; here is the man who lived in the factory—Benjamin Nickels, who positively swears, as your lordship has heard: he says this has been "from time whereof the memory of man is not to the contrary."

The Master of the Rolls.—That is rather a long time for him to swear to.

Mr. Pemberton.—He says, "he believes the same method has been applied from time immemorial by shoemakers and leather-cutters to the cutting of boot laces and leather thongs, and by other manufacturers," &c. &c.

The Master of the Rolls.—The principle, I think, has been applied a very long time in that way. I suppose every boy who has been at school, recollects that he might cut a piece of leather in the form of half a crown, and then cut it out afterwards in threads or strips.

Mr. Kindersley.—You cannot do that with India-rubber, my Lord.

The Master of the Rolls.—Are the drawings here, which are described as being the French work brought over here in November, 1834?

Mr. Morris.—Yes, my lord.

The Master of the Rolls.—Let me see one of them. (The book was handed to his lordship.)

Mr. Tinney.—We have a verified explanation, my lord, of the technical words in that book.

The Master of the Rolls.—It appears the very same thing, the plan of the machine is, to cut the disc of the caoutchouc; here are the two things revolving.

Mr. Pemberton.—I believe, my lord, there is a good deal of resemblance of the invention described in that book and ours: but it never was in use here. Doctor Ure says he saw that book, and that it is not a publication of the invention in this country, which would prevent persons obtaining a patent for it; I have not seen it, and therefore cannot tell what it is.

The Master of the Rolls.—In figure 2, you will see sufficient to explain how it is; there is a slight variation in the form of putting it.

Mr. Pemberton.—My lord, he says he had in constant use in their said factory a machine similar to that described in the dictionary, which your lordship has seen, which description was taken from the identical factory of Rattier and Guiball in Paris. And then, my lord, he refers to another work, I believe another French work entitled Dictionarie de l' Industrie Manufacturiere Commerciale et Agricole.

Mr. Tinney.—It is another description of the same, my lord.

Mr. Pemberton.—"That the said last mentioned work contains a description of a process and machine for cutting India-rubber from flat discs into bands or fillets, upon precisely the same principle as the machinery and process used in this country." Here again, my lord, I repeat, supposing this to be true, I cannot understand on what principle it is these parties have taken the course which they have taken here; they say we have long since abandoned it; at all events they put us to the arguing the demurrer, and answering the affidavits, and bringing it before your lordship in the way in which it stands. Then, my lord, there is an affidavit of Mr. Keene, the defendant, which is not of any consequence. He says he resides in Sussex Place, Regents' Park. That he never gave any order to Edward Woodcock; nor to his knowledge and belief, did his partner, Nickels, ever give any order to Woodcock, to construct a machine for the purpose of cutting India-rubber into tapes or fillets upon the principle of the plaintiff's patent invention. He says he has read the affidavit of Christopher Nickels, and he believes it to be true. Then there is the affidavit of Doctor Andrew Ure, principally, as it appears to me, giving his opinion upon the matter of law, and upon the validity of the specification. It seems to me that Dr. Ure, had either read Mr. Tinney's speech, or Mr. Tinney had read Doctor Ure's affidavit. The principal part of his affidavit goes to shew, I believe, that India-rubber is an elastic substance, and that the machine is for cutting India-rubber and leather hides, and similar substances, into tapes and fillets and so on.

Mr. Tinney.—Or cork.

Mr. Pemberton.—He is of opinion that the specification is invalid; that is a matter which I presume is either for your lordship, or rather for a court of law, to determine.

The Master of the Rolls.—Will you undertake to bring an action?

Mr. Pemberton.—Yes, my lord, we will undertake.

The Master of the Rolls.—If you undertake to bring an action, I think I ought to let this motion stand over till you have brought your action, and I know the result of that action, with liberty to the other side to apply at any time.

Mr. Tinney.—I think, my lord, I can shew your lordship that there is no pretence whatever for this.

The Master of the Rolls.—It will not prejudice you Mr. Tinney, in any way; they undertake to bring an action, whatever is done with this motion.

Mr. Pemberton.—We shall bring an action undoubtedly.

The Master of the Rolls.—Upon the evidence, as I see it now before be, I think I ought not now to interfere until the action is brought. I say nothing about the injunction; if they undertake to bring an action, I shall do no harm to any body, if I let this motion stand over until the action is tried.

Mr. Tinney.—Your lordship is acting upon the supposition of our infringing the invention; we are doing nothing of the kind.

The Master of the Rolls.—They are going to bring an action Mr. Tinney.

Mr Tinney.—Your lordship sees this gentleman has sold to the Caoutchouc Company, what he considers to be the patent invention; and, therefore, he is endeavouring to support the engagement he has entered into with the Caoutchouc Company; and as long as he can give any colour to the existence of this, he will do it.

The Master of the Rolls.—If he does not bring any action you can apply. Whatever my opinion might be, it will not save you from an action.

Mr. Tinney.—No, my lord, certainly, but it will be a considerable satisfaction to us to have the present motion dismissed and the injunction refused.

The Master of the Rolls.—I do not intend to grant the injunction.

Mr. Pemberton.—It will only be an additional expense.

Mr. Tinney.—I assure your lordship we think that we are vexed, and that we are entitled to have this motion refused with costs. It is a motion brought on in June 1839, on a pretended infringement which they themselves acknowledge they discovered in July or August last, they do not know which, and it is not until June 1839, that they bring forward this motion, being very likely pressed by the Caoutchouc Company. They renewed their notice of motion; they gave a notice on the 6th of December, and never did any thing under it, and on the 31st of May, they gave notice that they mean, to bring forward the motion again.

The Master of the Rolls.—The result of which is that I cannot grant the injunction.

Mr. Tinney.—I submit to your lordship, that we are entitled to the costs of this motion. Your lordship will recollect our demurrer was said to be vexatious, they having declined to insert the specification in the bill, your lordship did not know that they had not a good patent. Your lordship pronounced judgment with a strong intimation of your opinion, that, but for "Kay and Marshall," your lordship would have allowed it without costs. Our answer was put in on the 12th January.

The Master of the Rolls.—Your answer has been put in?

Mr. Tinney.—Oh yes, my lord, our answer was put in on the 12th of January last.

The Master of the Rolls.—I will hear this on—go on; Mr. Pemberton has not done yet.

Mr. Toriano.—If your lordship will allow me, I will state how it is; it is hardly fair that this objection should be made now. On the last motion day, Mr. Dixon and myself agreed to this minute, "Westhead v. Keene, to remain its in present state; no further affidavits to be made on either side; to be brought on the last day of this term, if practicable. Cornish and Keene (which is another motion in which the same parties are engaged) to stand over until the first seal after the term." This was the arrangement between my friend, Mr. Dixon and myself; I apprehend it is rather too late now to take this sort of objection; besides which they have filed two affidavits, one on the 4th of June.

The Master of the Rolls.—I don't wish to have any more of this; I have said I will hear the rest of this motion; I am quite sure it will be a waste of time, but still——

Mr. Pemberton.—Myself being of opinion with what has been suggested by the court, I do not think I can carry it further, if my learned friend (Mr. Kindersley) agrees with me; therefore, my lord, I put it upon this, we have filed affidavits in answer. Mr. Woodcock re-asserts positively what he has before sworn, and we have the affidavit of Mr. Fairey, a gentleman of as great intelligence and knowledge on scientific subjects as any in London or Westminster, and whose affidavit at least, is a full counterbalance to Doctor Andrew Ure's, who goes through the whole of the matter, and who states his opinion of the importance of the invention, and who answers the objections, as far as one scientific gentleman can dispose of the opinions of another scientific gentleman; with respect to the validity of the specifications, it is not a matter for either of them to deal with. He states as to the objections which have been made by these parties, that they cannot tell what the particular object of the invention is, he states, that he has no difficulty whatever, and with respect to the notion of this being an invention, for the purpose of cutting ivory and glass, and other things of that nature, it is quite absurd. My invention is an invention for cutting India rubber, and other similar substances, which can be cut into bands and tapes, and fillets, and not for cutting ivory and glass. My lord, he then states various other objections which have been taken by Dr. Ure; he disposes of them in a manner, which I believe your lordship will think is entirely satisfactory. Those objections, which are objections in point of law, are matters which have to be tried at law. The first is a point of fact, in the affidavit of Mr. Woodcock, and against that there is the affidavit of Mr. Nickels, the defendant, and Mr. Benjamin Nickels, his brother, and it will be for a jury to decide between them on that fact. As to the defendant Nickels, of course, he cannot be examined, but it will be for the jury to decide between the two parties, upon the evidence which will be adduced, whether the infringement which has been alleged, has, or has not been committed, and upon that the jury will come to a decision, if necessary; a court of law is more competent to dispose of these matters than a court of equity on the legal validity of the specification and patent, and if we find that the patent is invalid, what is the consequence? Why our bill will be dismissed with costs, and the present motion will also be dismissed with costs. Suppose we succeed, and this is dismissed, now we shall be in the position of having had our motion refused, and with costs; and it will be on evidence, which, after the trial, may turn out to be wholly false. Where is the justice, I would ask, in such a mode of proceeding? therefore, I take nothing more than in any case we may be entitled to, and I submit to those terms which have been suggested, at least by the court, that the motion stand over, we undertaking to bring an action; if we do not bring the action, then this motion will be dismissed with costs, and if we do bring the action, we must abide by that action, whether we succeed or not.

Mr. Toriano.—My lord, I am with Mr. Pemberton, and, in consequence of the affidavits of Nickels and

Keene, Mr. Woodcock has filed another affidavit, in which he reiterates the assertions in his first affidavit, and also exposes the fallacy of some parts of the affidavits of Nickels and Keene.

Mr. Kindersley.—I appear, my lord, for the Caoutchouc Company, who are made defendants, and who are interested in this; but the question being merely reduced now to the validity or invalidity of the patent, I do not think it right to trouble your lordship with any observations.

Mr. Tinney.—I appear, my lord, on behalf of the defendants, against whom the injunction is sought; and I assure your lordship I feel great unwillingness in giving the court trouble unnecessarily, but I cannot help thinking that the court will be saved a great deal of trouble by disposing now of this motion.

The Master of the Rolls.—You are of opinion, Mr. Tinney, and, therefore, argue, that when it is a mere legal question, which it is, as to the validity of the patent, and the plaintiff undertakes to bring an action, which is to be decided at law, that I ought to make an order, which is to be determined here first.

Mr. Tinney.—I thought the Court of Equity would not entertain any jurisdiction to prevent a person having his legal rights; but if there is anything which in the least degree inconveniences or prejudices the other party, you have a right to shew that he has not made out either a *primâ facie* case as to his legal right, or if he had made out a *primâ facie* case as to his legal right on the face of his patent, still we have a right to shew that the case is entirely disproved, because the invention is not new, and that his own conduct has been such, that he ought not to call upon the court to give him the least degree of assistance, or to do anything which will prejudice the defendants. I believe I am prepared to shew, my lord, first of all, that there is not a *primâ facie* case; and, secondly, that there is not the least case as to the invention being new; it was an old invention, and, therefore, there is no case; and, in the third place, I think your lordship will see that the conduct of the party has been such as not to entitle him to call upon the court for any relief at all by way of injunction.

The Master of the Rolls.—You need not trouble yourself upon that, because on the statements which have been made to me, and the evidence which has been read, I should not think fit to grant the injunction; neither do I think fit to put you to the inconvenience of an account; and further, if they did not undertake to bring the action, I should have refused the motion, with costs, in the way it stands; but if they do undertake to bring an action, the question is, whether I am to prejudice that action by dismissing this motion. If they do not bring the action, you will apply for the costs of the motion, and the costs of the suit, and every thing else; if they do bring the action, as they undertake to do, it will be determined at law. When can an action be brought? It ought to be done without delay.

Mr. Pemberton.—We will bring it forthwith at the sittings after this Term.

Mr. Tinney.—Your Lordship sees under what circumstances are they coming here? This party says he knew of the infringement sometime in July or August, he does not know which, and he does not pretend to say, not from Mr. W. but from a Mr. Sievier, whom he does not attempt to bring forward with any affidavit whatever; he then makes excuses, and says not in July or August, but towards the end of September he went to Paris, and that was the reason he could not file his bill till November. He then files his bill in so imperfect a form, that nobody could make out what was meant. There are certain affidavits filed, and we have replied by affidavits, and put in our answer on the 12th of January—the matter their rests,—he does not attempt to ask for an injunction, he waits until the 31st of May; and on the 31st of May he files affidavits which have been sworn in March, and

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gives us notice that at the next seal he shall move for this matter. We have used the greatest possible expedition; we have put in two affidavits to meet it. I do not know whether, after that, your lordship would think that this motion ought to be refused?

The Master of the Rolls.—I say I do not dismiss this motion with costs when the party undertakes to try it at law; I give him no countenance at all, not the least.

Mr. Dixon.—I was merely going to say, my lord, your lordship would not prejudice an action by now disposing of this motion. We are apprehensive that your lordship entertaining this motion, even to the extent to which your lordship has done, it might be thought that the plaintiff had some ground for coming here.

Ths Master of the Rolls.—Really Mr. Dixon, people are not so silly in this world as you suppose they are. I have given no opinion one way or the other, except this, that having heard it, and read what I have, I have refused to grant the injunction, and I refuse to put you to the terms of paying the costs, and I refuse to put you to keep an account, and not putting you upon terms is certainly in your favour, and not against you.

Mr. Tinney.—Of course, my lord, we should ask for liberty to move for a *scire facias.*

The Master of the Rolls.—You are under no sort of restraint. They undertake to bring the action forthwith. I cannot say how soon they will be at liberty to do so, if they can do it immediately. I put them upon terms of doing it.

Mr. Tinney.—I am afraid the action cannot be tried until after November.

The Master of the Rolls.—You are under no prejudice whatever.

Mr. Tinney.—The plaintiff undertaking to bring the action forthwith.

The Master of the Rolls.—The plaintiff undertaking to bring the action forthwith, let this motion stand over until the action is brought, with liberty for you to apply, if there should be any delay.

Mr. Dixon.—The defendants themselves to be the actors in any *scire facias.*

Mr. Tinney.—We are at full liberty to propose that.

The Master of the Rolls.—I cannot help thinking of the apprehension you entertain that you may be prejudiced.

ORIGINAL PAPER.

To the Editor of the Repertory of Patents.

Sir,—Observing a number of blocks of wood lying in the Old Bailey, evidently prepared for being laid down to form a wooden pavement for the carriage way opposite the Sessions House; and finding the blocks to vary greatly in dimensions, I measured several of them, and found some only eight inches and a half long, while others were nine inches and three eights. They are generally of the figure of a regular hexagonal prism, some of them, however, are a little conical, but the diameters vary so much, that it will be impracticable to fit them together, without leaving interstices between them, so great as to render the outer parts of blocks, liable to be chipped off by the feet of the horses and the wheels of the carriages passing over them.

The surface too of the ends of the blocks, each of which ought to be cut off exactly at right angles to the axis of the prism, form, in many cases, oblique angles with that axis, and consequently, when the blocks are placed end upwards, one side will be higher than the other, and thus the pavement will necessarily have an uneven surface, and much of the value of the wooden pavement be lost.

Having attentively watched, for about four years, from 1827 to 1831, the effect of much travelling over a wooden pavement well executed in the principle gateway of Vienna, and observed that it appeared to wear much less than any other kind of pavement, I frequently after my return to England, mentioned to our engineers, the superiority of wooden blocks, placed with the end of the grain upwards for a carriage way, and recommended its universal adoption.

But the goodness and durability will depend on the excellence of the workmanship; the blocks ought all to be cut exactly to one gauge, and laid on an even bed, I should consider a difference of a tenth of an inch in either length or breath, sufficient to disgrace any engineer, who would permit such blocks to be laid down contiguously. How great then must be my disgust at observing near an inch difference in the lengths, and more than an inch in the breadths of those blocks about to be used, in the Old Bailey.

Being thoroughly satisfied that neither comfort nor durability can possibly result from such excessively bad workmanship, and apprehensive that the numerous benefits and great economy of wooden pavements, will, for a length of time be lost to commmunity, if such a wretched specimen be allowed to influence public opinion, I deem it my duty to warn all those concerned, against a proceeding, which can only produce disappointment and public injury.

I am Sir, your obedient servant,

John Isaac Hawkins,
Civil Engineer and Patent Agent.

Quality Court, Chancery Lane,
London, July 24*th*, 1839.

LIST OF NEW PATENTS.

Richard Hodgson, of Salisbury Street, Strand, Gentleman, for improvements in the forms or shapes of materials and substances used for building and paving, and in their combination for such purposes. Communicated by a foreigner residing abroad.—Sealed June 27, 1839.—(*Six months.*)

Moses Poole, of Lincoln's Inn, Gentleman, for improvements applicable to wheeled carriages and in springs. Communicated by a foreigner residing abroad.—Sealed June 29, 1839.—(*Six months.*)

Henry Pape, of Little Newport Street, Leicester Square, Musical Instrument Maker, for certain improvements on stringed musical instruments.—Sealed July 2, 1839.—(*Six months.*)

Henrik Zander, of North Street, Sloan Street, Gentleman, for improvements in the manufacture of paper.—Sealed July 2, 1839.—(*Six months.*)

Charles Osborne, of Birmingham, Cork-Screw Manufacturer, for a certain improvement, or certain improvements, in the construction of cork screws.—Sealed July 2, 1839.—(*Six months.*)

Alexander Cochrane, of Arundel Street, Strand, Gentleman, for an improved lock.—Sealed July 3, 1839.—(*Six months.*)

Alexander Cruckshanks, of Liverpool Street, New Road, for certain improved methods of producing or manufacturing certain inflammable substances, and of applying the heat and light obtained from certain inflammable substances to various useful purposes.—Sealed July 3, 1839.—(*Six months.*)

James Yates, of the Effingham Works, Rotherham, Iron Founder, for certain improvements in making, forming, or producing raised or projecting letters, mouldings, figures, or other ornamental work for external decorations of buildings and other purposes.—Sealed July 3, 1839.—(*Six months.*)

Thomas French Berney, of Morton Hall, Norfolk, Esquire, for certain improvements in cartridges.—Sealed July 6, 1839.—(*Six months.*)

Edward John Jones, of Paulstone House, Hereford, Gentleman, and **John Ham**, of the city of Bristol

Engineer, for an improved process of manufacturing cider and perry.—Sealed July 6, 1839.—(*Six months.*)

George Philcox, of Southwark Square, Watch Maker, for certain improvements in chronometers, watches, and other time keepers.—Sealed July 6, 1839.—(*Six months.*)

John Ericsson, of Cambridge Terrace, Hyde Park, Civil Engineer, for an improved steam-engine, particularly applicable to locomotive purposes and steam navigation.—Sealed July 6, 1839.—(*Six months.*)

John Fairie, of Church Lane, Whitechapel, Sugar Refiner, for improvements in making and refining sugar.—Sealed July 6, 1839.—(*Six months.*)

Peter Rothwell Jackson, of Great Bolton, Lancaster, Engineer, for a new and improved method of mangling, calendering, glazing, and finishing cotton, linen, woollen, and other goods and manufactures, and certain machinery to effect the same.—Sealed July 8, 1839.—(*Six months.*)

Edward Francois Joseph Duclos, of Clyne Wood Works, Swansea, Gentleman, for improvements in the manufacture of sulphure, sulphuric-acid, and sulphate of soda.—Sealed July 11, 1839.—(*Six months.*)

William Woodley, of Observatory House, Stoke Newington, Captain in the Navy, for improvements in propelling vessels and carriages, and other machinery.—Sealed July 13, 1839.—(*Six months.*)

Thomas Bell, of St. Austel, Cornwall, Hotel Keeper, for improvements in obtaining copper from copper slag.—Sealed July 13, 1839.—(*Six months.*)

James Yates, of the Effingham Works, Rotherham, Iron Founder, for certain improvements in the construction of cupola furnaces, for melting metals.—Sealed July 13, 1839.—(*Six months.*)

Daniel Ramee, of Charlotte Street, Bloomsbury, for improvements in paving roads, and such like ways.—Communicated by a foreigner residing abroad.—Sealed July 15, 1839.—(*Six months.*)

John Hemming, of Edward Street, Cavendish Square, Gentleman, for improvements in gas meters.—Sealed July 16, 1839.—(*Six months.*)

John Reynolds, of Bridge Street, Blackfriars, Esquire, for certain improvements in the manufacture of salt.—Sealed July 16, 1839.—(*Six months.*)

John George Shuttleworth, of the Mount, near Sheffield, Soap Boiler, for a new mode of obtaining a rotary motion, from the rectilinear motion of the piston-rod of a steam or other the like engine.—Sealed July 18, 1839.—(*Six months.*)

Edward Brown, of Lyme Regis, Dorsetshire, Ironmonger, for improvements in apparatus used in cooking.—Sealed July 20, 1839.—(*Six months.*)

Thomas Nicholas Raper, of Bridge Street, Blackfriars, Gentleman, for improvements in rendering fabrics and leather waterproof.—Sealed July 20, 1839.—(*Six months.*)

Moses Poole, of Lincoln's Inn Fields, Gentleman, for improvements in casting for printing purposes. Communicated by a foreigner residing abroad.—Sealed July 20, 1839.—(*Six months.*)

Peter-Robert Drummond Lord Willoughby de Eresby, for improvements in compressing peat.—Sealed July 20, 1839.—(*Six months.*)

David Johnston, of Glasgow, Manufacturer, for certain improvements in the manufacture of hinges. Communicated by a foreigner residing abroad.—Sealed July 20, 1839.—(*Six months.*)

Alexander Southwood Stocker, of the Union Rolling Mills, Birmingham, and **Thomas Johnson**, of Ridgacre Iron Works, Stafford, for certain improvements in machinery for manufacturing shoe-heels and toe-tips.—Sealed July 20, 1839.—(*Six months.*)

John Charles Schwieso, of Albany Street, Regent's Park, Harp Maker, for certain improvements in the construction of locks.—Sealed July 20, 1839.—(*Six months.*)

Charles Flude, of Liverpool, Chemist, for certain improvements in the manufacture of white lead.—Sealed July 20, 1839.—(*Six months.*)

John Frederick Myers, of Albemarle Street, Piccadilly, Musical Instrument Maker, and **Joseph Storer**, of Bidborough Street, New Road, Musical Instrument Maker, for certain improvements in the construction of certain musical instruments, part of the said improvements being applicable to those of the kind commonly called pianofortes, and part of those of the kind commonly called seraphines, and to certain descriptions of organs. Partly communicated from a foreigner residing abroad.—Sealed July 20, 1839.—(*Six months.*)

Joshua Crockford, of Litchfield Street, Soho, Gentleman, for an improved mode of applying cotton and other wicks to tallow, and other the like substances used for candles, in order to consume the same.—Sealed July 20, 1839.—(*Six months.*)

John Hanson, of Rashcliff, York, Patent Lead Pipe Manufacturer, for certain improved apparatus for measuring and registering the quantity of gas, water, or other fluid passed through the same.—Sealed July 24, 1839.—(*Six months.*)

James Kay, of Pendleton, near Manchester, Cotton Spinner, of an extension for the term of three years from the 26th of July, 1839, of an invention for a new and improved machinery for preparing and spinning flax, hemp, and other fibrous substances by power.—Sealed July 24, 1839.—(*Six months.*)

James Templeton, Manufacturer in Paisley, and also **William Quiglay**, Weaver in Paisley, for machinery for a new and improved mode of manufacturing silk, cotton, woollen, and linen fabrics.—Sealed July 25, 1839.—(*Six months.*)

THE

REPERTORY

OF

PATENT INVENTIONS.

No. LXIX. NEW SERIES.—SEPTEMBER, 1839.

Specification of the Patent granted to James Hartley, *of Bishop Wearmouth, in the County of Durham, Glass Manufacturer, for Improvements in the Manufacture of Glass.*—Sealed December 1, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said James Hartley, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

My invention relates to the manufacture of that description of glass called spread or broad glass; and in order to give the best information in my power, I will, in the first place, shortly state the mode of manufacturing such description of glass heretofore practised, and then proceed to explain the improvements invented by me.

In making spread or broad glass, as heretofore practised, the workman blows a cylinder or cone, which is split lengthwise, when hot, and becomes a flat sheet, or is opened out by means of heat; the splitting or cutting being performed by placing the cylinder or cone in the spreading furnace, till it nearly collapses; it is then drawn out into the open air, and by a drop of water placed at one end, cracks or slits from one end to the other, as is well understood; and owing to the excise laws, in respect to broad or spread glass, the operation of splitting or cutting must be performed before coolingdown, after it is blown, and the annealing arch or furnace is only allowed to have one opening or mouth; and by the old means of conveying broad glass from the flatting furnace, the glass must be very highly heated, to permit of its being carried through the air. Owing to such excise laws, any improvement in the manufacture of spread or broad glass, must be such as to be capable of being performed in conformity with such laws, and according to the means heretofore resorted to, the bottom of the spreading or flatting furnace is convex, in order that when the glass is becoming flat by the force of heat, no air may be below it; and it is well known that if the glass were to remain quiet during such spreading operation, the glass would bend over the convex surface, and be of very irregular figure; to prevent which, the workman, during the process of spreading or flatting, turns the sheet round, whilst in a highly heated state, on the convex bed of the furnace, and thus brings each portion of the edge thereof towards the fire, and permits the same to become more heated, and by care and judgment he so moves the sheet of glass on the convex bed, as to obtain the same into a flat or plane surface; he then immediately withdraws it from the furnace on to a flat iron table, at the mouth of the spreading furnace, at which time the glass is in a highly heated state, which, as before stated, is necessary to prevent the breaking of the glass on its being carried through, and exposed to, the open atmosphere from the spreading furnace, in order to be placed in the annealing furnace, or arch, which carrying is performed by a fork called a "fushet." And it is well known that, owing to the process of spreading, by moving the glass on the convex bed of the furnace, in the highly heated state (suitable to produce the flatting or spreading, and to its being subsequently carried through and exposed to the atmosphere,) materially injures the surface of the glass.

Now according to my invention, the cylinder or cone is cut or slit by an improved process. It is spread by pressure on a flat surface, or bed, kept at a lower temperature than those heretofore used, and it is conveyed to the annealing arch or oven, by means of a heated table or surface, which runs on wheels, moved and guided by a suitable railway. I consequently obviate the necessity of having a convex bed, and dispense with the turning or revolving movement of the glass, so prejudicial when in a highly heated state, which is necessary according to the old process, to get it into a level sheet by the force of heat, on a convex bed; and further, owing to the mode of carrying from the spreading furnace to the annealing arch or oven, I am enabled to dispense with the necessity of heating the glass so highly as heretofore, by the heat of the table or surface, on which the glass is carried, preventing the prejudicial chill or action of the atmosphere.

Having thus generally pointed out the nature of the old processes resorted to, and the nature of the bed of the furnace used, and the prejudicial effects consequent thereon, and having also shortly referred to the peculiarities of the processes when performed according to my invention, I will now proceed more particularly to describe my improvements.

Description of the Drawing.

Fig. 1, shews an elevation of a spreading or flatting furnace in section, arranged according to my invention, together with three annealing arches or ovens of the ordinary construction.

Fig. 2, is a plan of fig. 1, the same being shewn in section, in order to the internal arrangements being readily understood.

Figs. 3 and 4, shewing elevations of the two end views of the spreading furnace.

In each of these figures the same letters indicate similar parts. *a*, *a^1*, being the spreading furnace, which is divided into two compartments by the wall or partition, *a^2*, there being an opening from the compartment, *a*, into the compartment, *a^1*, through the wall, *a^2*, as is shewn in the drawing. *b*, *b*, are two sets of fire bars, on which fires are kept constantly burning, and I prefer the same to be of wood, instead of coal. *c*, is the spreading table or bed of the furnace, which is flat, and I prefer the same to be of sand-stone, such as is obtained from Godstone, in the county of Surrey; but I do not confine myself thereto. *d*, is an opening, through which the cylinder or cone is to be placed into the spreading furnace, in order to its being heated, from whence it is removed to the table, or flat bed, *c*, to be spread by pressure, as hereafter explained. *e*, is an opening through which the workman inserts the instrument for spreading the cylinder or cone into a flat sheet of glass. *f*, is the opening through which the sheet of glass, when opened out, is slided from the table, or bed, *c*, on to the bed or table, *g*, in the compartment, *a^1*, of the spreading furnace or oven; and it will be seen that the table, *g*, is carried by a frame of iron on wheels which run on a railway, as is shewn in the drawing, the fronts of the annealing arches being built parallel with the railway; hence the table, *g*, brings the sheets of glass up close to the mouths of the annealing arch or furnace, all which will readily be understood on an examination of the drawing; and it will readily be understood, that the table or surface, *g*, (which is made of similar material to the table or bed, *c*,) will be kept heated, by being brought into the compartment of the spreading furnace, *a^1*, and the workman having stopped the bed, *g*, opposite any one of the annealing arches, he, by means of the "fushet," removes the sheet of glass from the table, *g*, and places it into the annealing arch in like manner to that heretofore practised.

Having thus described the nature of the furnace employed for spreading the glass, and also the machinery and apparatus for carrying the sheets of glass from the spreading furnace to the annealing arches, I would remark that I make no claim to that part of the process of making broad or spread glass, which relates to the producing cylinders or cones; up to that part of the process, where the same is to be cut, the cylinders or cones are to be made as heretofore practised; but I prefer that class of good and skilful workmen who can produce the most perfect cylinders; nor do I claim the annealing arches or ovens, or the process of annealing, they being similar to what have been before practised and used; and my invention commences with that part of the process which relates to cutting or splitting of the cylinder longitudinally; and I perform that operation by means of a bar of iron, which, being heated red hot, I pass or rub from end to end, of the cylinder of glass, two or three times, having some charcoal, or other carbonaceous matter, between the heated iron bar and the cylinder, by which means the glass will be split or cut. The split cylinder or cone being placed on the flat table of the spreading furnace, I proceed to flat or spread out the same into a sheet, by pressing the same on the flat bed, by means of a small block of wood affixed on an iron bar. The description of wood I employ for flatting the glass is elder well soaked in water; but I do not confine myself thereto. And I would remark, in respect to the temperature at which the broad or spread glass is preferably spread, according to my invention, is such, that the operation may be performed in a minute. With this information, a workman, with very little practice, will readily perform my invention. The workman having flatted or spread a cylinder or cone into a sheet of glass, he pushes it through the wall, a^2, on to the table or surface, *g*, by which it is conveyed to one of the annealing arches, as above explained.

Having thus described the nature of my invention, both as to the processes, and also as to the furnace, machinery, and apparatus employed, I would have it understood, that what I claim is, first, the mode of splitting cylinders or cones of glass, as above described.

Secondly, I claim the mode and furnace employed for flatting or spreading broad or spread glass, by means of pressure on a flat bed, as herein described.

And thirdly, I claim the mode of carrying broad or spread glass from the flatting furnace, as herein described. —In witness whereof, &c.

Enrolled June 1, 1839.

Specification of the Patent granted to JOHN HOWARTH, *of Aldermanbury, in the City of London, Manufacturer, for certain Improvements in Machinery for Spinning, Roving, Doubling, and Twisting Cotton and other Fibrous Materials.*—Sealed January 11, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c., *Now know ye*, that in compliance with the said proviso, I, the said John Howarth, do hereby declare the nature of my invention of certain improvements in machinery for spinning, roving, doubling, and twisting, cotton, and other fibrous materials, to consist in a new arrangement in the spindle and tube or flyer, used in spinning, roving, doubling, and twisting machinery, together with certain modifications in the drag, or resistance, applied to the spindles or bobbins, by which I am enabled to perform the process of spinning, roving, doubling, and twisting with more efficiency and dispatch than heretofore. And the manner in which the same is to be per-

Fig 6

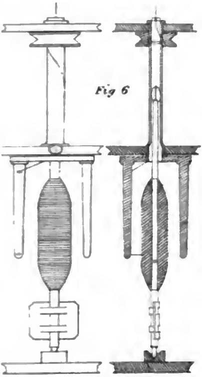


Fig 5

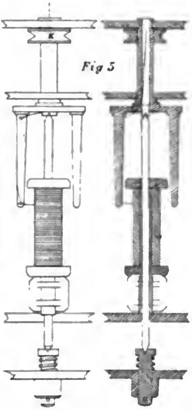


Fig 4

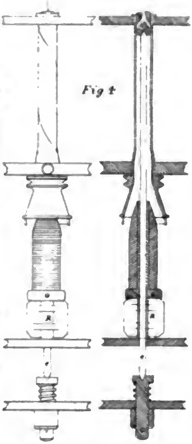


Fig 8

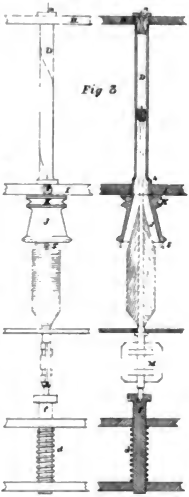


Fig 1

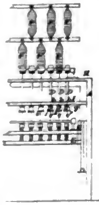
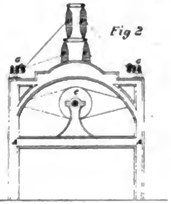


Fig 2



HOWARTH'S

PATENT

Fig 3

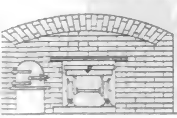
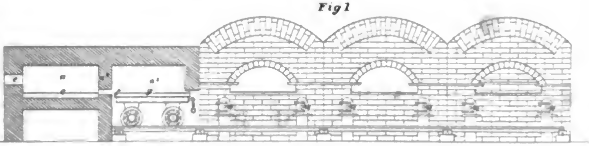
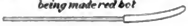


Fig 1



Instrument for splitting & cutting the cylinders the thick end being made red hot



HARTLEY'S PATENT

Instrument for pressing the cones or cylinders flat

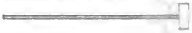


Fig 2

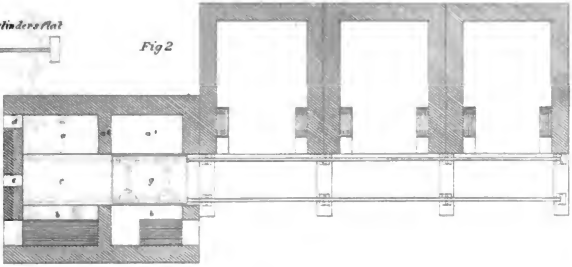
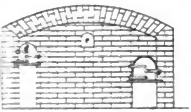


Fig 4



LONDON Hodson 112 Fleet Street September 2 1839

formed and carried into effect, is set forth and described in the annexed drawing, and the following description thereof. In this drawing the scale is marked thereon, and the various letters and figures of reference indicate the same parts throughout. But before I proceed to describe my improvements in reference to the annexed drawing, I would remark, that the whole of the figures hereinafter referred to, relate to the cotton spinning machine called the throstle; and that I have not shewn my invention, as applied to roving machines, considering such sufficiently obvious after the following description of their application to the throstle.

Description of the Drawing.

Fig. 1, exhibits a front elevation of part of a throstle, to which the modification of my improvements, marked fig. 3, is applied, and

Fig. 2, is a side or end view of the same, having the geering for driving the drawing rollers removed, for the purpose of rendering the direction of the thread more distinct. In these figures, A, A, represents the framing. B, the driving shaft, on which is fixed the long tin drum, C, that imparts motion to the tubes, D, and ultimately to the spindles, *e;* the parts marked E, are the copping rails, upon which the spindles are mounted, by the alternate or copping motion of which, the peculiar construction and form of the cop is effected; this motion may be varied by any of the several well known movements that are used for that purpose. The rovings are delivered from the bobbins or spools, F, upon which they were previously wound, and pass in the direction indicated by the red lines, between the drawing rollers, marked G; thence enter a small hole at the upper extremity of the tube, D, and pass in a diagonal direction to the outside, immediately under the rail or support, H. The thread is then coiled once or twice round the cylindrical part of the tube, and re-enters the interior of the tube near the point, marked, *h*, a little above the rail, I, and passes along the inside of the conical part, J, through the eye, S, and finally to the spindle, the particular construction of which will be more fully described hereafter.

For the purposes of doffing or removing the bobbins or caps from the spindles, I cause the rails upon which the spindles are supported to be lowered, so that the tops of the spindles may clear the trumpet or bell mouth, J, and then move out in a diagonal direction, as seen in dotted lines at fig. 2. In case a thread is broken, the tube is stopped by means of the small set screw, *g*, having a piece of leather at its extremity, to prevent the tube from being injured. I wish it to be known, however, that several contrivances may be successfully used for this purpose; the spindle is then pressed down as afterwards described, and the wire, N, is put through the hole, *h*, as best seen in fig. 3, with its hook downwards; the thread is then passed through the eye, S, and finally drawn up by the wire, N; it is then coiled once or twice round the cylindrical part of the tube, D, and put through the hole, *n*, at the top, and finally united to the sliver from the drawing rollers. I would observe that the holes in the tubes should be placed exactly opposite to each other, and the eyes, S, should be in a line with them, as shewn.

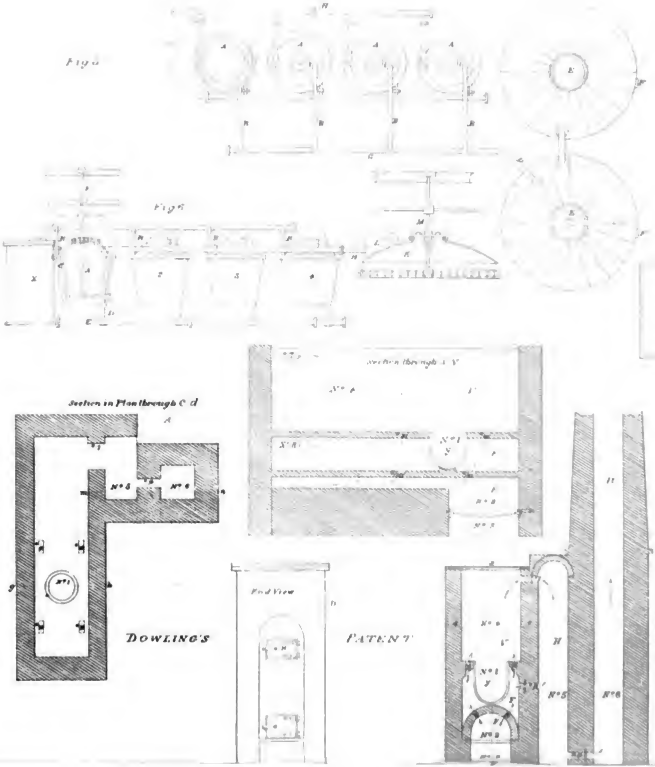
Fig. 3, represents an elevation and section of a tube drawn full size, for the purpose of rendering my inventions more clearly understood. The lower end of this tube is expanded in the form of a trumpet-mouth, and is provided with suitable bearings, as shewn; there is also the warve or wheel, K, that has motion communicated to it from the drum, on the driving shaft, by means of the band or list, best seen at fig. 2. The spindle, marked, *e*, is supported on a step or bearing, *f*, of the form shewn in the drawing, which is accurately fitted to the rails, marked, E: this step is kept in its position by means of the spiral spring, *d*, which allows the spindle to be lowered, in case a thread should break, thus providing room for the operative to find the broken end. Instead of the trumpet mouth, J, of the tube, D, two flyer legs may be secured into the lower part of the warve, over which the thread may pass to the spindle; in this case the ordinary step in one copping rail may be used. The upper extremity of the spindle, *e*, is sustained in a small roller, the diameter of which corresponds with the bore of the tube, D. The roller rests upon a shoulder formed near the top of the spindle, *e*, on which it turns freely, while the roller is so nicely fitted to the spindle and tube, between which it acts as to admit of no lateral vibration of the spindle. I must, however, observe, that the spindle may be supported in a small ring, that is, accurately fitted to the lower end of the tube, D, and being of uniform diameter, would rise and fall in the inside of the tube. The peculiarity of this part of the invention being the means of sustaining the spindle, so as to allow it to vibrate with the copping rail in the interior of the tube, D. The contrivance by which I cause a superior drag on the yarn or thread to any hitherto used, is accomplished by means of the piece of tin or other suitable metal, M, as seen at fig. 3, fixed near the lower end of the spindle, *e;* the revolution of which causes sufficient resistance through the medium of the atmosphere, to maintain a steady and uniform tension to the yarn, while in the act of spinning. I would, however, remark, that the superficial area of this piece of tin, M, must be determined by the quality or strength of the cotton or other fibrous material, of which the yarn is to be composed, and also the degree of fineness into which it is subsequently to be spun, together with the velocity of the spindle. This area may be made greater or smaller, by making the drag of two pieces of tin or other metal, so that they may slide together; this drag I denominate an atmospheric-drag. The thread passes in the direction already described, through the small hole at the top of the tubes, and thence in the direction shewn by the red lines through the small eye, S, at the bottom of the conical or trumpet mouth, J, to the spindle. Now it will be seen, that when motion is imparted to the tube, the tendency to revolve the spindle by the tenerior of the yarn, is retarded by the atmospheric-bag already described; and thus the speed of the spindle, or that part of the cop upon which the yarn is being wound, varies according to its circumference, so as to take up the yarn at a uniform tension, as delivered from the drawing rollers.

Fig. 4, represents an elevation and section of another arrangement, by which I am enabled to wind upon a spool or bobbin, the necessary resistance or drag upon the yarn being accomplished by means of the atmospheric-bag as before described; by referring to the section of the same figure, the spindle will be seen supported on a step, provided with a spiral spring, by means of which the spindle is retained in its proper position, and also allows the spindle to be displaced at pleasure. The bobbin, Q, is fitted so as to turn freely on the spindle, *e*, having the drag before mentioned inserted in a small slit in the lower part of the bobbin, Q, prepared for that purpose; this drag is fixed to a small tube, R, that revolves with the bobbin.

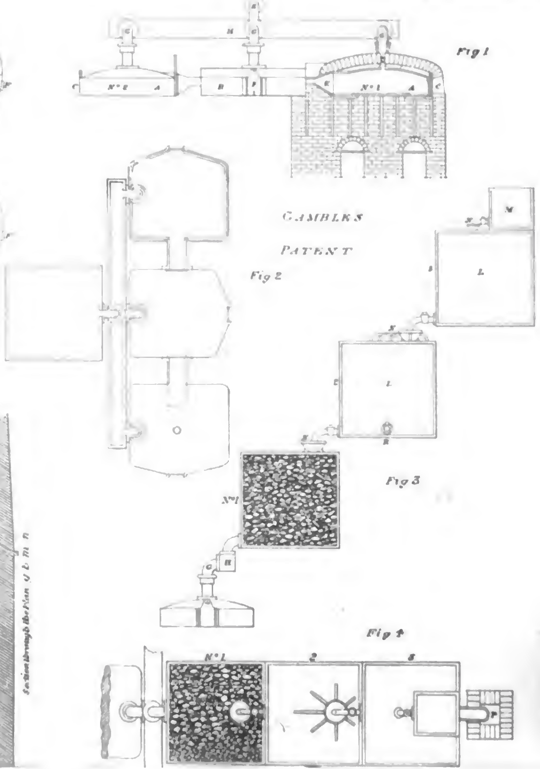
Fig. 5, represents an elevation and section of another modification as the preceding in fig. 4, accommodated to a flyer of the form shewn in the drawing, motion being communicated to the flyer through the warve, K; the spindle, *e*, being sustained on centres at each extremity, while the flyer revolves in suitable bearings, ass hewn; this spindle being also provided with the atmospheric-drag as hereinbefore mentioned.

Fig. 6, is a modification of fig. 3, the only difference being the introduction of a flyer, as shewn, instead of the conical part of the tube, which may be varied to suit the form of the cop required. In all these views the thread is shewn in lines coloured red.

Having now described my various improvements in



DOWLING'S PATENT



GAMBLE'S PATENT

machinery for spinning, roving, doubling, and twisting cotton and other fibrous materials, as applied to the throstle in figs. 1, 2, 3, 4, 5, and 6, all which, with slight variations, may be applied to the machinery for roving cotton and other fibrous material, I wish it to be understood that I do not claim any of the well known parts of the ordinary machinery, as set forth in the figs. 1 and 2, for the purpose of shewing my application of my improvements to the throstle; but I do claim the supporting the spindles at each extremity, in the combination and application thereof, as set forth and described herein, and any obvious modification of the arrangements, together with this application of the atmospheric-bag, and also the manner in which thread enters and passes round the tube to the spindle or bobbin, as before shewn; all which improvements in machinery for spinning, roving, twisting, and doubling cotton and other fibrous material, are, to the best of my knowledge and belief, new and never before used in this kingdom. I deliver this as a true and faithful specification of the same.—In witness whereof, &c.

Enrolled July 11, 1839.

Specification of a Patent granted to JOSIAS CHRISTOPHER GAMBLE, *of Saint Helens, in the County of Lancaster, Manufacturing Chemist, for Improvements in Apparatus for the Manufacture of Sulphate of Soda, Muriatic Acid, Chlorine and Chlorides.*—Sealed March 14, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Josias Christopher Gamble, do hereby declare that the nature of my said invention and the manner in which the same is to be performed is described as follows, and illustrated by the drawings hereunto annexed.

Instead of the brick furnace hitherto employed for the decomposition of common salt, and for its conversion into sulphate of soda, I have found that iron retorts constantly maintained at an elevated temperature, may be advantageously substituted for that purpose, and the muriatic-acid gas disengaged therefrom effectually condensed by the receivers hereafter described.

This will be best made to appear by a description of the drawings hereunto annexed.

Description of the Drawings.

Fig. 1, exhibits an elevation and partly a section of three furnaces or retorts of cast-iron. A, No. 1, is a section of a furnace set in brick-work. It is set on six brick walls, between which the fire circulates under the bottom of the retort, returns round its sides and passing over the top enters the flue leading to the chimney. On the bottoms of A, Nos. 1 and 2, are laid flat iron plates about inch thick and five feet square, to protect the bottoms from the sudden changes of temperature caused by the introduction of the sulphuric-acid.

A, No. 2, is an elevation of a similar furnace without its brick-work. The furnaces, A, A, may be named the decomposing furnaces, and B, the roasting or finishing furnace. Common salt is thrown on the bed of the furnaces, A, A, through the doors, C, C. The bottoms of the doors are elevated six inches above the bottoms of the furnaces, to guard against the flowing over of sulphuric-acid. Each door has a sliding shutter with an aperture at its lowest part, to permit the constant stirring of the materials. The form of this door is shewn at F, of furnace, B. As soon as the furnaces and the salt contained therein are raised to a heat of 200° to 300°, Fahrenheit, the proper proportion of sulphuric-acid is added through pipe, D. I prefer acid of 1750 specific gravity. On the first addition of the acid the workman commences with his rake and keeps constantly stirring the materials till they become solid. At this stage the sulphate of soda is collected in front of the door and pushed forward into the roaster, B, through the inclined-plane door, E. A second workman spreads the sulphate over the bottom of the roaster and continues working it till all the gas is expelled, when it is drawn from the furnace into iron wheel-barrows through the door, F. It will be necessary to maintain the roaster, B, at a heat uniformly approaching redness.

As the above operation proceeds the muriatic-acid gas expelled from the salt, passes from each furnace through their respective branch pipes, G, G, G, into the main pipe, H, and from H, it passes through pipe, K, into first receiver.

Fig. 2, is a plan of the three furnaces shewing the branch pipes that attach them to the main pipe and the connexion of main pipe with first receiver.

Fig. 3, is an elevation of roaster, B, and the three receivers L, L, L. M, is a water cistern placed over No. 3 receiver. Water from this cistern is made to flow through a stop-cock into a small basin, N. N, has five apertures on the same level, through which it pours its contents into five small pipes, O, O, O, O, O, which deliver the water through holes made at equal distances in the top of No. 3 receiver. The water percolating through No. 3, reaches its bottom, a weak acid. It passes through a cock into a basin on top of No. 2, is distributed as before, and reaches its bottom a stronger acid; it enters No. 1, in the same manner, and is finally drawn off into reservoirs for use. The three receivers are filled with broken glass or siliceous pebbles, in order to multiply the moist surfaces with which the gas is brought in contact. The pebbles are left larger at the bottom and diminish as they approach the top of each receiver.

Fig. 3, shows the three receivers so placed one above the other that the water percolates from the one to the other as described above.

P, fig. 4, is a horizontal section of the chimney and pipe which connect the furnaces and receivers with the main chimney, by which a draft is constantly maintained through them. When it is desirable to prepare muriatic-acid of different strengths, a second cock may be inserted in No. 2, receiver, to draw off such a portion of the acid as it may be expedient to prevent running into No. 1. By this precaution No. 1, may be made to yield muriatic-acid of any required strength. The weak acid drawn from No. 2, may be returned to the upper cistern instead of water, or used for any purpose to which weak acid is found applicable. At R, No. 2, receivers, figs. 3 and 4, are shown the disposition of the cocks for drawing off the weak acid. The cocks, tubes, and basins, are made of the species of pottery called stone-ware. The cocks should be inserted on a level with the bottom, in order that the last portions of the acid may be withdrawn from the receivers. The receivers are made of flags from Halifax in Yorkshire, the joints are grooved and fitted, and afterwards made secure by any of the lutes used by chemists for confining acids.

Fig. 5, is a plan of my new apparatus for the manufacture of chlorine and chlorides. A, A, A, A, are four stills, the bottoms made of earthenware, the tops of lead. They are surrounded by cast-iron casings, leaving a space of three inches at bottom and sides. The stills are heated by the circulation of hot water, saline solutions, or steam from boiler G. I prefer the circulation of hot water between stills and casings. B, B, B, B, are branch pipes leading from stills to a main pipe, G. At the end of pipe, G, is a shorter pipe, D, which is made by means of water-lutes to move alternately to receivers, E, E. A small door, about ten inches square, is made on the side of each receiver, E, say at F, to withdraw the chloride when the process is completed: these must be made air-tight by luting. These receivers are adapted to the manufacture of chloride of lime, or what is commonly called bleaching-powder, but the stills are well adapted to the manufacture of liquid chlorine, liquid chlorides of lime, potash, or soda, or any chlorides now in use. Any suitable receiver may be adapted to these processes, care being taken that the water-lutes shall be made so deep as to overcome the pressure in such receivers.

Fig. 6, is in part a section, and in part an elevation of the same apparatus. A, shows the earthenware still bottom, and the manner of attaching it to the leaden top and iron casing. The bottom is an inverted cone, two inches in thickness, and six inches of the upper part is made conical. To these six inches the top is fitted with fat lute, and firmly bound round by an iron hoop. The lower part of the lead is prolonged below the hoop, and turned up with a flanch, so as effectually to close in the space for hot water, and extend over the flanch of the iron casing, to which it is firmly attached by screws, and made water tight with cement. For the purpose of discharging the still, a pipe proceeds from its bottom, five inches long, three inches internal diameter, and two inches in thickness. It is made to pass through another pipe in the outward case, two inches long and eight inches internal diameter. The space between these pipes must be made secure from leakage by lead or cement. When the still is at work the pipe will be secured by a plug. The branch pipes, B, B, B, B, that convey the water within the casing, pass through the flanch of the leaden top at C. D, a branch pipe, which conveys the cooled water to the main pipe, which returns it to the boiler. F, an agitator for stirring the materials in the still: it is secured to the two beams in such a way, by nuts and collars, as to prevent it touching the bottom of the still. From the still, A, the main pipe, joined by branch pipes from stills, 2, 3, 4, is joined to receiver, K, by the moving pipe, L. The bottoms of the receivers are made of cast iron, with a ledge about two inches deep, the sides and top of wrought iron: they are made circular, about one foot in depth at the side, and two feet at the centre. M, an agitator, to stir the lime, working in a pivot at bottom and a collar at top. The stills and receivers have waterlute lids, through which they are charged. This kind of still is peculiarly adapted to the use of muriatic-acid; or a mixture of muriatic and sulphuric-acids.

I do not claim the exclusive use of iron retorts, but I do claim as my invention, iron retorts, worked in connexion with each other, as above described, and also iron retorts constantly worked through a door, open or partly open, while the process is going forward, the draft of the chimney drawing in a portion of the external air with the muriatic-acid into the receivers; neither do I claim the exclusive use of receivers filled with glass or pebbles, but I claim the use of receivers so arranged, that the acid can pass from one to the other, or can be cut off at pleasure when strong acid is required.

I do not claim earthen stills as my invention, but I do claim for my exclusive use, earthen stills with leaden heads, encased in iron, heated by the circulation of hot water, saline solutions, or by steam. I further claim my mode of changing the lime receivers, by which lime, already in part saturated with chlorine, is exposed to the strongest gas, and the remnant of the gas is exposed to a surface of fresh lime. It will thus be perceived that the receivers shall be discharged alternately, and that the receiver, which is stronger during one process, shall be the weaker during the next.—In witness whereof, &c.

Enrolled July 3, 1839.

Specification of the Patent granted to THOMAS DOWLING, *of Chapel Place, Oxford Street, in the County of Middlesex, Gentleman, for Improvements in Preparing Metals for the Prevention of Oxidation.*—Sealed January 24, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Dowling, do hereby declare the nature of the said invention consists in certain improvements of preparing metals for prevention of oxidation. And I declare that the manner in which I perform the same, is fully shewn in the following particular description of the said improvements in preparing the metals (that is to say):—

The pieces of metals intended to be prepared, are to be first dry rough ground, upon coarse grinding stone, such as are commonly used for grinding the coarsest hardwares; I say dry rough ground, because it is usual to grind wet, that is, that in general the stones are made to revolve in a trough containing water, or a small current of water is made to flow upon the stones whilst they are running, whereas it is essential to my purpose that the pieces of metal be ground with stones quite dry. The grinding will be completed when every part of the surface of the metal has received a rough polish.

The pieces when so ground or rough polished, are to be immediately put into what I call a conservative bath, in which they are to remain not less than forty-eight hours, after which time they may be taken out as they are wanted for continuing the processes of preparation. This, which I call the conservative bath, is composed as follows (that is to say); into a suitable vessel I put 120 gallons of soft or rain water, to which I add 120 pounds of soda of commerce, thirty pounds of chalk or very good quicklime, and one gallon of pure olive oil, these ingredients are to be well stirred up together, and in twenty-four hours after, the bath will be fit for use, and the pieces of ground or rough polished metal may then be put into it, but great care must be had not to let them touch each other, and the liquid ought to be kept as quiet as possible as the liquid wastes by evaporation and use, the vessel may be refilled by adding fresh liquid, observing carefully to use the same proportion of ingredients as above given. When the pieces of metal are taken out of this bath to undergo the next process of preparing, they are to be put in the sun, or in any warm place, to dry quickly, but on no account are they to be rubbed for the purpose of drying them.

The next process to which the metals are to be submitted in the order of preparation is what I call operating, which process, as well as the machines and tools with which it is achieved, I will now fully describe (that is to say):

This process of operating is the rubbing of the ground or rough polished surfaces of the metals, either in a hot or cold state, with zinc, until they have acquired a soft smooth face and zincky appearance, which is palpable to the touch as well as to the eye. The better to effect this in a superior manner, as well as with economy, I make use of certain machines and tools of various forms and sizes; the principal machines which I make use of for this purpose are what I call operating zinc wheels. These wheels may be made of any diameter and breadth, and they may be constructed of any material suitable; they are to be fixed upon axles in the ordinary manner, and made to revolve in a framing or framings sufficiently strong to resist the required speeds. The whole or parts of the circumference of these wheels is or are to be covered with zinc, and I do not confine myself to any particular mode of placing and fixing the said zinc upon the said whole or parts of the circumference of the wheels; wheels, pulleys, or cylinders of solid zinc will answer the purpose very well, but that which I find to be the best and cheapest, is to cast a ring or rim of zinc, two or three inches thick, upon and about the circumference of a cast-iron pulley, wheel, or cylinder, having one or more grooves in its or their circumference or circumferences. Now when this ring or rim of zinc is cast upon the said wheel, cylinder, or pulley, a part of the melted zinc will run into the groove or grooves of the said wheel, cylinder, or pulley, which will hinder the said ring or rim of zinc from becoming loose, which, otherwise, it is liable to, when running at very high speeds and heavily pressed upon by the pieces of metal in the act of operating. These wheels require to be perfectly cylindrical, which is easily accomplished by turning them true upon the bearings in which they are to operate. The speed of these operating zinc wheels varies according to the nature of the work, but I prefer to employ three wheels in succession, the first wheel makes or revolves at the rate of 1200 feet at the circumference, per minute, the second wheel revolves 2000 feet per minute, and the third wheel revolves 4000 feet per minute, but I do not confine myself to these particular speeds alone. The workmen are protected by strong wooden guards from accident, in case the wheel breaks whilst working at these high speeds. The manner of operating is very simple, and is the same as that which is practised by grinders and polishers of iron and steel goods, (that is to say,) by holding the pieces under operation upon the wheels and pressing thereon more or less as may be practicable or necessary. The pieces of metal to be operated upon are first submitted to the slowest wheel and to be finished with the wheel of quickest speed. In preparing pieces of copper or iron which have curvelinear and angular forms, and which cannot be submitted to the circular action of the grinding-stones and the operating zinc wheels, the grinding or rough polishing is to be replaced by rasp or very rough filing, and the process of operating is to be done by hand with what I call zinckers, which are tools made of zinc, and which tools are of almost every form and size to suit the curves and angles of the pieces to be operated upon. The operation of zincking with these zinckers is simply that of rubbing as hard as possible upon the surface of the metals which have been rasped or rough filed with the tool or zincker, in the manner of filing, until the said surfaces have acquired the appearances before named.

In operating upon very large plates of metal, such as boiler plates, plates for large vats or brewing coppers, &c. &c., I use what I call lumps, which are heavy pieces of zinc in form of cube or otherwise, and the process of operating with the lumps is by moving them backwards and forwards upon the surface of the said plates by an alternate movement. During the process of operating, whether with operating zinc wheels, the zinckers, or the lumps, it will be advantageous from time to time to throw on the surface of the metal under operation a little finely powdered sal ammoniac; when the pieces of metal have got a sufficient dose of zinc in the process of operating, they are to be taken to what I call the galvanic-vapour furnace, for the purpose of undergoing what I call the galvanic process, the construction of the said galvanic-vapour furnace as well as the manner of working it in order to complete the galvanic process, I will now describe, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):

Description of the Drawing.

In the drawings, A, B, C, D, are shewn, first, a sectional plan; second, two vertical sections; third, an end view of the said galvanic-vapour furnace. This said furnace is composed of a heating furnace, with grate and bars, F, vapour galvanic furnace, V, with crucible, J, condensing flue, H. The figures of reference are as follows:

No. 1, is a crucible made of refractory or fire-clay, in the manner, and of similar materials, as the crucibles used by glass-blowers.

No. 2, is the heating furnace, with grate-bars furnace.

No. 3, is the ash-hole.

No. 4, is the galvanic vapour furnace.

No. 5, is the condensing-flue.

6, is the chimney.

7, is a small flue with a damper, which communicates between the galvanic-vapour furnace, V, and the condensing flue, H.

8, is another small flue with a damper, which communicates between the heating-furnace and the condensing flue. The flue, No. 8, is to be used only when the fire in the furnace has been newly lighted, afterwards when the galvanic-vapour furnace has acquired a heat sufficient to melt lead, then the damper in the flue, No. 8, is to be closed, and the damper in the flue, No. 7, is to be opened.

No. 9, is a flue and damper, communicating with the chimney which is kept open or shut as circumstances may require, and which can be judged only by the person who has acquired some experience in directing this process. In the furnace, F, an arch is built over the whole length and width of the grate-bars, and the heat is communicated first to the bottom and sides of the crucible and afterwards passes into the vapour furnace by the small flue, No. 10; without the interposition of the arch the crucible would be broken by the direct contact of the flame.

I will now describe the manner of working this galvanic vapour furnace, which is as follows (that is to say):—

In the first place the pieces of metal which have undergone the process of operating are to be carefully placed in the vapour furnace, V, and in the condensing-flue, H, so as not to touch each other. The pieces are to be introduced through the iron doors, of which a suitable number must be made in the ends and sides of the said flue and furnace. When the furnace and flue are charged with the desired quantity of pieces of metal, the doors are to be carefully closed and luted, to hinder the vapour from coming out during the process. Before closing the vapour furnace, 100 pounds of zinc must be put into the crucible, J, through the door, R, seen in the front elevation, D. A fire is now to be lighted in the furnace, F, and the damper No. 8, is to be opened and must remain open until the galvanic-vapour furnace has acquired a heat sufficient to melt lead, when the damper is to be closed and that of No. 7, is to be opened, and kept open until the end of the process, which now in reality commences, and the heat of the said furnace must be inward so as to cause the zinc to burn or deflagrate, and this heat must be kept up during four hours; the fire is then to be allowed to go out and the damper of the chimney to be closed, when the process will be finished, the greater or less success of which will depend upon the person who will superintend the fires, which ought to be kept up with great regularity, communicating with the chimney during the process, and from time to time it will be of advantage to put a small quantity of green or fresh cut wood or bark into the furnace, F. It will have succeeded satisfactorily if the metal have assumed a dull bluish colour resembling laminated zinc. The furnace must be left to cool, after which it is to be opened and the pieces of metal taken out and the sublimated-zinc, which adheres about the furnace and more particularly about the walls of the condensing flue, are to be carefully collected. The pieces of metal as soon as taken out of the furnace may be covered with a thick coating of good paint or varnish of any colour required.

And whereas having now particularly described my said improvements in preparing metals for preventing oxidation, I declare that I do not claim as my invention the system or machines used in the process of grinding or roughing the metals, nor do I claim as my invention the covering of the said metal with varnish or paint. But

I claim as my invention, firstly, the process of the conservative bath hereinbefore described and as applied to the metals after rough grinding.

Secondly, I claim as my invention the process of operating upon metals by means of the operating zinc-wheel, the zinckers and the lumps, the whole as hereinbefore described and as applied to the zincking of metal.

Thirdly and lastly, I claim the process which I call the galvanic process, together with the galvanic-vapour furnace, as hereinbefore described, and as may be seen by reference to the drawing here annexed, and as applied for the preparation of metals according to the manner aforesaid. And such my invention to the best of my knowledge and belief being new and never before used in that part of her Majesty's United kingdom of Great Britain and Ireland called England, her said dominion of Wales, or Town of Berwick upon Tweed, I do hereby declare this to be my specification of the same, and I do verily believe that this my said specification doth comply in all respects, fully and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to my said invention.—In witness whereof, &c.

Enrolled July 20, 1839.

Specification of the Patent granted to Moses Poole, *of the Patent Office, Lincoln's Inn, in the County of Middlesex, Gentleman, for Improvements in Tanning.*—Sealed February 28, 1839

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Moses Poole, do hereby declare the nature of the invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):—

The invention relates to a mode of tanning by means of pressure of fluids, whereby the liquor is caused to press first in one direction, and then in another; and, in order that the invention may be more fully understood and readily carried into effect, I will describe the apparatus employed.

Description of the Drawing.

Fig. 1, represents an elevation of the apparatus; and

Fig. 2, a plan thereof. The vessel into which the hides or skins to be tanned are placed, being of wood, bound round with iron hoops, and the lid or cover is held down by iron clamps, as is clearly shewn by the drawing, such clamps being readily removed by withdrawing keys; and by means of screws and nuts, the tightness of the clamps, and, consequently, of the lid or cover, may be ensured, all which is clearly shewn in these figures.

Fig. 3, is an elevation; and

Fig. 4, a plan of vessel made of iron, the cover being secured with screws or nuts. In other respects, the vessels, figs. 3 and 4, are substantially the same as in figs. 1 and 2, and the mode of using them is the same. In each of the figures, the same letters indicate similar parts. *a*, *b*, are two cocks, and *c*, is the supply-pipe; and the pressure to the hides or skins will depend on the altitude of this pipe; this pipe is connected to the upper and lower part of what I will call the tanning vat, and the liquor will be caused to flow in at the upper or lower part of the tanning vessel, according as the cock, *d*, or d^1, is opened.

Fig. 5, shews the section of another apparatus similar to those already referred to, but differing in respect to the mode of obtaining the requisite pressure; for in place of depending on the altitude of a column of fluid, a weight-screw or spring may be employed, as is shewn in the drawing. In this case, the tanning-vat being filled by the pipe, *c*, the cock, *e*, is to be closed, and the plunger, *f*, either pressed down by means of weight-screw or spring, and correct pressure determined on, will be governed by the pressure on the lever, *g*, pressing on the valve over the opening to the branch-pipe, as shewn in the drawing.

Having thus explained the nature of the apparatus employed, I will shortly state the mode of operating. The cover being removed, and the tanning-vat empty, the hides or skins (previously suitably prepared, as is well understood) are to be placed therein, placing between each layer a quantity of bark to keep them separated, and a quantity of liquor is permitted to flow into the tanning-vat from time to time, as it becomes filled with hides, in such manner as to displace any air which might otherwise remain; at the same time, however, the liquor is not to rise so high as to interfere with the man placing the skins or hides in the tanning-vat. When the vat is filled in this manner, the cover is to be fastened down, and the liquor permitted to flow and drive out the remainder of the air through the upper cock, when the same is to be closed, and the apparatus will be in working condition; and the operation is to be carried on by alternately opening and closing the cocks, *d*, d^1, in order to change the direction of the pressure of the tanning liquor employed, and in such manner the operation of tanning is to be carried on until the operation is fully performed, the tanner occasionally removing the cover, to examine the progress of the process.

I would remark, that I am aware that various means have been before resorted to for tanning hides and skins by the pressure of fluids, I do not, therefore, lay claim thereto, unless the same be performed according to the invention herein described. But what I do claim, is the mode herein described of tanning hides and skins by means of the pressure of fluids, by means of changing the direction of the pressure thereof, as herein described.—In witness whereof, &c.

Enrolled August 23, 1839.

Specification of the Patent granted to THOMAS LUND, *of Cornhill, in the City of London, Cutler, for Improvements in Extracting Corks from Wine and other Bottles, with Steadiness, Facility, and Safety.*— Sealed August 3, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Lund, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

My invention relates, First, to an apparatus for holding bottles combined with a cork-screw, by which a person may withdraw a cork with greater steadiness and safety than can be done by any means heretofore resorted to, where the cork-screw and the apparatus for receiving and retaining the bottles are not so relatively combined, as in fact to become one machine.

Secondly, my invention relates to the application of springs to cork-screws, which embracing or holding the upper end of the neck of the bottle, retain it correctly, during the penetration of the screw into the cork, and during the withdrawal of the cork from the bottle.

LUND'S PATENT

Fig 1

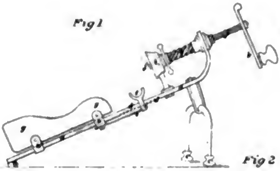
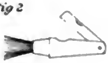


Fig 2



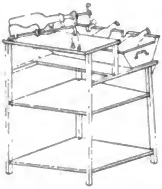


Fig 3

Fig 4

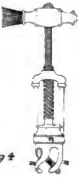


Fig 1

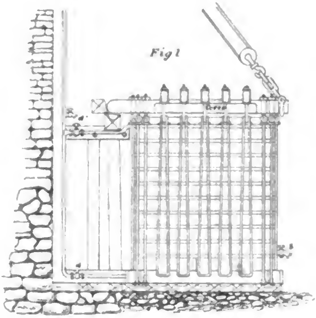


Fig 3

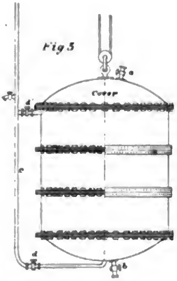


Fig 4

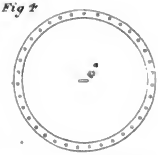


Fig 2

POOLE'S PATENT

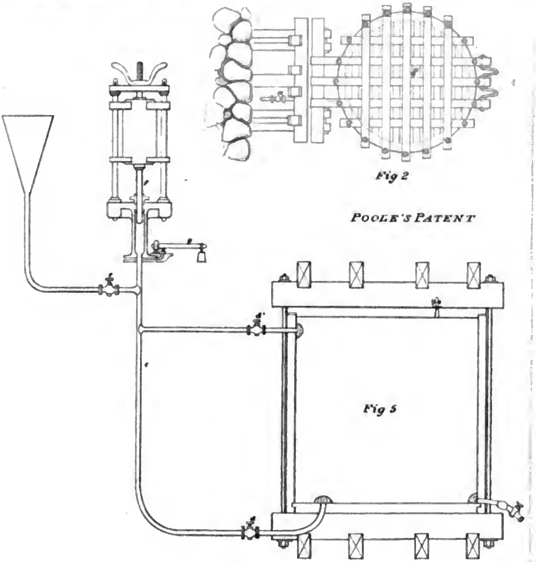


Fig 5

WORTH'S PATENT

Fig 3

Fig 1

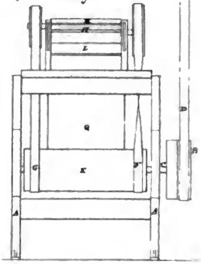
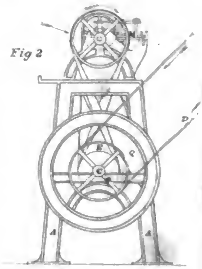


Fig 2



LONDON Hodson 112 Fleet Street September 2 1839

Description of the Drawing.

Fig. 1, represents an apparatus constructed according to my invention. The dotted lines shewing a bottle supported in a position to have the cork drawn therefrom. *a*, is a bar which at its lower end has a knob or foot, *b*, as is shewn; and it has also two feet, *c*, *c*, applied by screws and nuts, or the same may be affixed in any other manner. On the under side of the bar, *a*, are formed teeth, *d*, having a spring catch, *e*, which has at all times a tendency to enter the teeth, when permitted by the finger-piece, *f*, not being pressed on, such finger-piece embracing the bar, *a*, is capable of being slided along that bar, the object of which will be hereafter described. *g*, is the holder for the bottle, which I usually make of sheet-iron, though it may be of other material, and I line it with leather, for better bedding the bottle. The holder, *g*, is bent to a proper figure to receive bottles, that they may lie securely at the time a cork is being removed, and the elevation of the upper end of the bar is such as to retain the bottle at such an angle as not to allow the wine or other liquid to flow out when the cork is drawn. The bottle-holder, *g*, has two slides, *h*, which embrace the bar, *a*, and are capable of sliding along it, in order to place a bottle in the holder, and to slide it up to a proper position for the cork-screw. *i*, is the socket into which the head of the bottle enters; this socket is affixed to the bar, *a*, as is shewn. *j*, is a cork-screw which is carried by the upper end of the bar, *a*. In using this apparatus, supposing the bottle-holder to be at its greatest distance from the cork-screw, the bottle is to be placed in the holder, which is then to be slided along the bar till the end of the neck of the bottle enters the socket, in the position shewn by the drawing; by turning the handle, *k*, the screw will enter the cork, and continued motion will cause the screw, *l*, to withdraw the cork, as is well understood in using cork-screws of similar construction. When the cork is drawn, by pressing down the finger-piece, the bottle-holder and bottle may be slided away and the bottle removed. Thus it will be seen that the object of this part of my invention is to combine a cork-screw with a suitable apparatus for holding or sustaining the bottle. And I would remark, that, although, I consider the apparatus shewn, to be the most simple and the best means of carrying out this part of my invention; the parts may be varied, provided the general character of my improvements, as above described, be retained.

Fig. 2, shews a knife, suitable for cutting off the ends of corks, previously to their being drawn; such knife being provided with a brush to remove saw-dust, &c., from the bottle. This is rendered desirable owing to the cork-screw combined in the apparatus, not having a brush.

Fig. 3, shews a convenient table for a butler's pantry, or for a wine cellar, with a proper trough or tray for receiving bottles.

Fig. 4, shews the second part of my invention, which is an ordinary cork-screw with my improvement applied thereto. *m, m,* are springs which are cut out of sheet-steel and tempered, they are affixed to the lower part of the socket, *n,* as is shewn in the drawing. When it is desired to draw a cork with this cork-screw, the springs, *m,* are first slided on to the neck of the bottle, which they will hold, and retain the cork-screw correctly. And I would observe in respect to this part of my invention, that, although, I have shewn springs of a particular form, I do not confine myself thereto, as springs of other figures may be applied so long as they are capable of performing a like office.

Having thus described the nature of my invention, I would remark, that although I have shewn a particular description of cork-screws for each part of my invention, I do not confine myself thereto, as it is evident that in place of the double screws, as shewn, a rack and pinion, and other well known apparatus may be employed, for my invention, in neither case, depends on the construction of the parts constituting the cork-screw. But what I claim as the invention secured by the present letters patent, is, First, the combining of a cork-screw with suitable means for holding or sustaining a bottle, into an apparatus as above described; Secondly, I claim the application of springs, *m*, as above described.—In witness whereof, &c.

Enrolled February 3, 1839.

Specification of the Patent granted to John Swain Worth, *of Manchester, in the County of Lancaster, Merchant, for the Improved Machine for Preparing and Cleaning Wool for Manufacturing Purposes.*— Sealed January 11, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c., *Now know ye*, that in compliance with the said proviso, I, the said John Swain Worth, do hereby declare that the nature of the said invention of an improved machine for preparing and cleaning wool for manufacturing purposes, consists in a new combination of machinery, by which I am enabled to separate or divide the wool in its raw state, or subsequent to the willowing process, from burrs or other extraneous matter, and render it clean and in a more fit state for the various manufacturing purposes to which it is to be applied, and the manner in which the same is performed and carried into effect, is set forth and described in the annexed drawings, and the following description thereof. In these drawings the scale is marked thereon, and the various letters and figures of reference indicate the same parts throughout.

Description of the Drawing.

Fig. 1, represents an elevation; and

Fig. 2, a side view of the improved machine for the purposes hereinbefore described, in which A, A, represents the frame-work. B, the driving-pulley fixed in the driving-shaft, C, which has motion communicated to it from any convenient source, by means of the strap, D. On the shaft, C, is placed the long drum, E, that imparts motion through the straps, F and G, to the two rollers, H and I. These two rollers revolve in suitable bearings in the frame-work of the machine, and the diameters of the drums or pulleys for driving them are regulated, so that the surface speed of each roller shall be the same. A guard or knife, marked K, is fixed at its extremities to the framing, and placed in a diagonal direction over the lower roller, as best seen at fig. 3. The edge of this guard or knife, K, is turned up with a burnisher, similar to the edge of a currier's knife. There is also a clearer, marked L, made of thin wrought-iron plate, having the edge that presses against the roller furnished with a covering of woollen cloth, which, by coming in contact with the surface of the roller, removes any particles of wool that may have a tendency to adhere to it. And M, represents a similar clearer for the same purpose, having a similar covering as that described for the lower roller, H.

Having described the various parts of which the machine hereinbefore mentioned is constructed, and the direction of rotation of the cylinders or rollers, H, and I, being indicated by bent arrows, at fig. 3, the operation of the machine in cleaning the wool will be as follows: Supposing the wool in its raw state to be fed by hand, or spread on an endless cloth, or any other well known apparatus for feeding, and moved in the direction of the arrow, P, towards the rollers, H and I, that revolve at about 600 revolutions per minute, it will be drawn forward by the rotation of the lower roller, H, and freed of the earth or extraneous matter by the knife or guard, which is adjusted at the requisite distance from the roller, H, to suit the nature of the wool, and also the quantity and quality of extraneous matter it contains. The wool then passes between the rollers, H and I, by which operation any earthy particles, which may have escaped the knife are crushed, and the wool then passes down the shoot, Q, on to the floor, or into any receptacle provided for that purpose.

Having now described the construction and mode of operation of the invention of an improved machine for preparing and cleaning wool for manufacturing purposes, as heretofore described, I wish it to be understood, that I do not claim any of the several or well known parts of which the machine is composed; but I do claim the combination of two rollers in conjunction with the guard or knife, as hereinbefore described for the purposes before mentioned. And such the invention being to the best of my knowledge and belief new and never before used in this kingdom, I deliver this as a true and faithful specification of the same.—In witness whereof, &c.

Enrolled July 11, 1839.

Specification of the Patent granted to HARRISON GREY DYAR, *late of Cavendish Square, but now of No.* 286, *Regent Street, Gentleman, and* JOHN HEMMING, *of Edward Street, Cavendish Square, Gentleman, both in the County of Middlesex, for Improvements in the Manufacture of Carbonate of Soda.*—Sealed June 30, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, we, the said Harrison Grey Dyar and John Hemming, do hereby declare that the nature of our said invention, and the manner in which the same is to be performed, are described and ascertained in manner following (that is to say) :—

The nature of our invention consists in the use of carbonate of amonia (that is the sesqui-carbonate or bi-carbonate) in the manufacture of carbonate of soda, by applying it to decompose common salt, and also in afterwards restoring or recovering the ammonia which has been so used, or the greater part thereof, in such a way as to allow of its being used again to convert other portions of common salt into carbonate of soda, thus repeatedly producing successive portions of carbonate of soda from the same portion of ammonia. To render the description of our process more intelligible, we divide it into two parts. The first part being the description of our method of using the sesqui-carbonate or bi-carbonate of ammonia in the manufacture of carbonate of soda. The second part being the description of our method of restoring or recovering the ammonia, or the greater part thereof, in such a way as to be again employed in converting other portions of common salt into carbonate of soda.

As to the First Part.

The carbonate of ammonia of commerce is what chemists call the sesqui-carbonate, and in describing our process we shall use the term carbonate of ammonia as denoting the sesqui-carbonate; the bi-carbonate is not generally met with, but is to be preferred when it can be obtained, and accordingly in reproducing the ammonia, we recommend the process to be carried on in such manner as to produce as much of the bi-carbonate as possible. We take nearly equal quantities by weight of common salt, otherwise called chloride of sodium or muriate of soda, and of carbonate of ammonia. We dissolve the common salt in as much water as is barely sufficent to dissolve it, so as to constitute a fully saturated solution, and when so dissolved we add to it the carbonate of ammonia in the solid form, but bruised or pounded to a state of fine powder. We prefer that the common salt should be the substance dissolved, and to add to it the said carbonate of ammonia in a pulverised state but the result may be obtained by dissolving the ammonia, and adding the common salt in a state of powder, but according to our experience, this is not quite so well.

We mix these well together, and suffer them to remain thus mixed, from ten to twenty hours, stirring or agitating them from time to time, to prevent the solid parts from settling before the chemical action is sufficiently complete. We then drain or filter the liquid from the solid matter, and in order to separate as perfectly as is convenient all the liquid from the solid matter, we press the substance in an ordinary hydraulic or screw-press, or submit it to considerable pressure by any other convenient mode. The solid matter thus obtained is chiefly a carbonate of soda, containing however more carbonic-acid than is found in soda ash, or crystals of carbonate of soda of commerce. To remove this excess of carbonic-acid, and to recover any ammonia contained in the carbonate of soda, we next place the solid matter, so obtained as aforesaid, in a retort or other convenient vessel, and heat it from about six hundred degrees to eight hundred degrees of Fahrenheit until all the liquid and volatile matter contained in it is drawn off by that heat. The substance left in the retort is the carbonate of soda. We pass the matter thus volatilized into a cool chamber, or refrigerating apparatus, an example of which is furnished by the lead-balloons used in the condensation of carbonate of ammonia in the usual manner, wherein the carbonate of ammonia becomes condensed—but any convenient mode of condensing ammonia may be adopted.

As to the Second Part.

The liquid separated from the solid matter (that is to say) from the solid carbonate of soda by the pressure in the operations, described in the first part of this specification, or by filtration, contains in solution muriate and carbonate of ammonia, common salt, and, probably also a small portion of carbonate of soda formed. In order therefore to separate the carbonate of ammonia therefrom, we place it in a distilling vessel, and distil over the water and the carbonate of ammonia, and receive the product into a cask or proper vessel, which we keep filled with carbonic-acid, obtained from any economic source, in order to prevent loss of ammonia. Or instead of distilling over, as above described, the water and the carbonate of ammonia, we add to the liquid a solution of muriate of lime, or chloride of calcium, which is one of the results of our process, until a precipitate, which is chiefly carbonate of lime, ceases to fall. We separate this precipitate carbonate of lime by filtration or other means, from the liquid, which is then chiefly a solution of muriate of ammonia and common salt. We evaporate this by heat, to a sufficient consistency to enable us to separate the common salt—(in cases where it is desirable to do so on account of the value of common salt,) which being less soluble in hot or boiling water than muriate of ammonia, crystallizes first, and may be separated by well known means. When the common salt is removed from the liquor, (if desirable, or without that process, if not, thought worth while,) we evaporate by gentle heat the muriate of ammonia to dryness, and mix it intimately with a sufficient quantity of pounded chalk, and heat the mixture in an iron retort, or other proper vessel, until the carbonate of ammonia formed by this operation is sublimed and separated in the usual way. We receive this carbonate of ammonia in a chamber or vessel formed of lead, or other suitable material, where it becomes condensed, and we make a communication by means of a pipe, between this chamber or vessel, and another chamber or chambers. Into one or more of these chambers we cause the carbonic-acid and other volatile matters to pass, which were expelled by heat from the carbonate of soda formed, as before described, in the first part of this specification. We receive the carbonic-acid into one or more of these chambers, for the purpose of preventing loss of ammonia, by converting free ammonia into carbonate of ammonia, or bi-carbonate of ammonia; and if the carbonic-acid from the soda is not sufficient for this end, we pass more into them, which we obtain from coal, coke, charcoal, or any other economic source, as well as a sufficient quantity of water, or vapour of water, to condense and save the ammonia. Or, in order effectually to prevent the loss of ammonia, we pass into the last of the vessels or chambers we employ to receive and condense the carbonate of ammonia, a sufficient quantity of muriatic-acid gas, obtained by adding sulphuric-acid to common salt, or from any other economic source. The muriatic-acid gas combining readily with free ammonia, or the carbonate of ammonia in vapour, forms muriate of ammonia, and thus precipitates in the chamber, by which operation we avoid any loss of ammonia that might otherwise ensue. The muriate of ammonia thus obtained, we treat in the same manner as the muriate of ammonia separated from the liquids before described, so that this muriate of ammonia may be converted into carbonate of ammonia or bi-carbonate. The carbonate of ammonia obtained or re-produced or recovered from distilling the muriate of ammonia with chalk, as hereinbefore described, as well as that obtained by the distillation of the liquid, as also hereinbefore described, or by any of the other modes hereinbefore described, we employ over again to convert other portions of common salt into carbonate of soda, according to the plan detailed in the first part of this specification. The common salt separated from the muriate of ammonia, as before described, we again employ with other portions of common salt in subsequent operations. The residue found in the retorts after the sublimation of the carbonate of ammonia, is chiefly muriate of lime, or chloride of calcium, which may be used as before mentioned. In all the operations we have described for the manufacture of carbonate of soda, we employ vessels or apparatus of such construction as to expose the carbonate of ammonia employed as little as possible to the air, so that the loss of ammonia may be prevented.

We do not claim as our invention any particular form of vessels or apparatus in which our operations are conducted, nor any of the chemical substances above mentioned merely as such. But, we claim as our invention or improvements, the use of carbonate, or bi-carbonate of ammonia in converting common salt into a carbonate of soda, as hereinbefore described. And as this mode would be too expensive to be profitable, if we could not recover the ammonia used for this purpose, so as to make it available for repeated operations, we claim, in combination with the former part, the process, as hereinbefore described, for recovering the ammonia, which would otherwise be wasted. —In witness whereof, &c.

Enrolled, December 29, 1838.

Specification of the Patent granted to EDMOND HEUZÉ, *of Fenton's Hotel, Saint James's Street, in the County of Middlesex, Merchant, for Improvements in the Manufacture of Dextrine.*—Sealed September 27, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I the said Edmond Heuzé, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, is described and ascertained in the following explanation thereof (that is to say) :—

The invention consists in the formation or manufacture or production of the substance known in chemistry by the name of dextrine, by means of the admixture and action of nitric-acid, with and upon the farina of potatoes (usually called potatoe-starch) or the flour or starch of wheat, barley, or other appropriate farinaceous grain or seeds, and preparing such mixture as hereinafter described, whereby the same is converted into dextrine, at a much less expense, and in a state more serviceable for manufacturing purposes than by any means hitherto discovered. This operation may be performed in different ways, but the following is the process which at present appears to me the best, and which I employ.

The farina, flour, or starch, being in a dry state, a portion of nitric-acid of the specific gravity of about 1.4, equal in weight to one 400th part of the farina or flour, is mixed with such a quantity of pure water as is sufficient to wet the farina, flour, or starch, which is then carefully mixed with this fluid, so that every part of it may be wetted much as bread is mixed or kneaded.

It is not however necessary (though I think preferable) that the farina or flour of potatoes and similar substances, should be brought into a dry state, but it may be used as it is obtained by the maker from the tub or vat. In such case, a less portion of water will be required in the admixture of the nitric-acid.

The paste thus formed is divided into lumps of any convenient size, say about twenty-five pounds weight, and these should be put to drain for a few hours, to allow any superfluous moisture to run off. The lumps should then be broken with the hands into small pieces, and placed in a chamber heated to any degree not exceeding 176 degrees of Fahrenheit, and kept there till perfectly dry (which at the heat of 176 degrees will be done within twenty hours), and they are then reduced to the state of flour, by pounding or grinding, and the use of a bolter or sieve; and this flour is then placed in an oven heated to from 212 to 248 degrees of Fahrenheit, where it is kept till thoroughly dry. The time necessary for this purpose will vary according to the degree of heat, from about a quarter of an hour to five minutes: the lower the degree of heat within the prescribed limits, the dextrine will be the whiter, which is advantageous.

When wanted to be used for any of the purposes which I shall presently describe, the dextrine thus obtained is to be mixed with water, either cold or hot. The proportion of water varies according to the consistence of the liquor required, which differs for different purposes. The product is a gummy or gum like liquor, similar to the solution of gum-senegal in water, and its principal uses are as a substitute for that gum.

The most general object for which the dextrine is used, is a substitute for the solution of gum-senegal and other gummy or gum like substances, in printing and dressing silk, cotton, linen, and other fabrics; in painting or printing paper-hangings, in all sorts of distemper painting, in stiffening the different fabrics which require it, such as gauze, and in all the preparations which required formerly the use of starch and calcined starch, calcined farina, or British gum; also in the preparation of adhesive plaisters and bandages for surgical purposes, in glazing visiting cards and other papers: in short, it is a perfect substitute for gum-senegal and other gummy and gumlike substances, in all processes of this nature with which I am acquainted, while it is much cheaper than any of them.

Any heated chamber and any oven in which heat can be obtained at the degrees mentioned above, will answer the above purposes.

I wish to observe, that I do not confine my invention to the particular process or preparation, or mode of mixing which I have above described. These are merely pointed out as the most convenient methods that I have discovered of employing my invention, which is the use of nitric-acid mixed with water and farinaceous vegetable matter, and exposing it to the degrees of heat stated, so as to thereby produce dextrine—but I do not claim as new, or of my invention, the application of dextrine to the processes I have above mentioned, or any other.—In witness whereof, &c.

Enrolled March 27, 1839.

Specification of a Patent granted to GEORGE HADEN, *of of Trowbridge, in the County of Wilts, Engineer, for Improvements in the Manufacture of a Soap or Composition applicable to the Felting, and other Processes employed in the Manufacture of Woollen Cloth, and other Purposes for which Soap is usually employed.*— Sealed October 8, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said George Haden, do hereby declare the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof (that is to say) :—

My invention relates to the application of castor-oil, in substitution of the oils and other fatty matters heretofore used in soap-making, whether for the processes of manufacturing woollen-cloth or other purposes. The various modes of manufacturing soap being well known, and as my improvements by the application of castor-oil, does not interfere with such processes, it will not be necessary to enter into any particular description thereof, and the soap-maker will, as heretofore, vary the materials compounded with the castor-oil, according to the object he desires to attain.

I have found that the mixing at the rate of five cwt. of castor-oil with the caustic leys produced from one cwt. of salts of soda, produces a very good quality of soap, when boiled and treated in the usual manner of soap-boiling. I would, however, remark, that I do not confine myself to any particular quantities, nor to any particular matters which are to be mixed with castor-oil in the making of soap, as they will necessarily vary, as heretofore, in making soap from oil or other fatty matters.

The plant which produces the castor-bean is well known to be very productive, and will grow freely in the colonies of the British crown, particularly in the West Indies, and will become extensively in demand when soap is made therefrom, and may be produced and brought to England at a very low cost, and render this country independent of foreign produce. And I would have it understood, that what I claim as my invention is the application of castor-oil in substitution of the oils and other fatty matters heretofore employed in soap-making.—In witness whereof, &c.

Enrolled April 8, 1839,

LAW REPORTS OF PATENT CASES.

Roll's Court, Westminster Hall. Wednesday, 29*th of May,* 1839.

In re John Sharp's Patent.

This was an application on the part of Joshua Wordsworth, of Leeds, in the form of a petition to the Master of the Rolls, praying that a memorandum of alteration in the specification of the said John Sharp, of the 8th of April, 1837, which had been filed and enrolled under the Letters Patent Amendment Act, might be taken off the Rolls of the Court and cancelled.

Mr. Russell appeared for the petitioner, but the respondent did not appear, he being advised that not only had the court of chancery or the Master of the Rolls no jurisdiction over the subject matter of the petition, but that the service of it upon the respondent (who resided in Scotland), was altogether null and void. Mr. Russell applied for an order as of course in default of the respondent appearing, and tendered an affidavit of service of the petition; but the Master of the Rolls said, he always considered that a party not appearing, supposed every thing would be done correctly in his absence, and therefore he must hear the case first, before making any order.

The fact of the service of the petition in Scotland was then brought by the officer of the court to the notice of the Master of the Rolls, who immediately called upon Mr. Russell for some authority for such a course of proceeding.

Mr. Russell submitted that it was a case arising out of the new act, for which there could be no precedents. That the petitioner would have no means of redress, if some mode of serving parties out of the jurisdiction was not allowed.

The Master of the Rolls said, that might be a very good ground for an application for substituted service, but not for such a service as had been made in this case, and asked if the respondent had employed any agent in London, in preparing and filing the memorandums, on whom service might be ordered? He, however, enquired, whether there was any power given him by the act to interfere in any way? Was not the memorandum void, if as the petition contended, it exceeded the limits of the Act, and what more could the petitioner want?

Mr. Russell contended that the existence of the memorandum upon the roll of the court gave the patentee a *prima facie* right, which was a grievance to the patentee and others, and that they ought not to be driven to a more expensive remedy.

The Master of the Rolls.—You have a plain easy remedy elsewhere. If it goes beyond the act, as you say, it is void, and could not be given in evidence, or made any use of. Besides, if it were a specification under the old law, what jurisdiction should I have to take it off the roll.

Mr. Russell.—The court has power over its records, and has been in the habit of exercising jurisdiction over any alterations in them. This is a corruption of the records of the court.

The Master of the Rolls.—The court has never gone further than to allow of clerical errors being amended.

Mr. Russell.—There are cases where, after amendments have been allowed, other parties have come and complained of them, and orders have been made to annul such amendments.

The Master of the Rolls.—But there an injury was done to parties; here there is none. You say the memorandum is wholly void.

Mr. Russell suggested that the court should make an order *nisi* to take the memorandum off the file, to be served on the patentee's agent in London.

The Master of the Rolls.—I do not know that the law gives any such remedy: the act is silent upon the subject. Does it not give certain protection to the public by caveats and by empowering the Attorney and Solicitor General to direct advertisements.

Mr. Russell.—It certainly does, but until lately these guards have not been acted upon. Now they are; and such a case would probably not again occur.*

The Master of the Rolls.—If I were to décide that this memorandum was void, and to order it to be taken off the roll, and it turned out that it was not so, what situation would the patentee be in? I should be depriving him of his patent. I apprehend I have no discretion about receiving a memorandum when it has been sanctioned by the Attorney or Solictor General, and therefore how could I make an order which would have the effect of depriving a patentee of his rights under the act altogether? At all events I can make no order on the present service.

Mr. Russell then applied for leave to make a substituted service of the petition, but the Master of the Rolls declined granting this until there was proper evidence before him that the patentee had an agent in England upon whom such service could be properly made, and he was strongly inclined to think he could then do nothing in it.

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* We understand that, in fact, advertisements were published both in the London and Scotch papers in the present case.

SELECTED PAPERS.

CAP. LXVII.—*An act to amend an act of the fifth and sixth years of the reign of King William the Fourth, intituled "An Act to amend the Law touching Letters Patent for Inventions."* [*24th August*, 1839.]

Repealing provision requiring the application by petition to be prosecuted with effect before the expiration of the term of the patent.—Whereas by an act passed in the fifth and sixth years of the reign of his Majesty King William the Fourth, intituled "An Act to amend the Law touching Letters Patent for Inventions," it is amongst other things enacted, that if any person having obtained any letters patent as therein mentioned shall give notice as thereby required of his intention to apply to his Majesty in council for a prolongation of his term of sole using and vending his invention, and shall petition his Majesty in council to that effect, it shall be lawful for any person to enter a caveat at the council office, and if his Majesty shall refer the consideration of such petition to the judicial committee of the privy council, and notice shall be first given to any person or persons who shall have entered such caveats, the petitioner shall be heard by his counsel and witnesses to prove his case, and the persons entering caveats shall likewise be heard by their counsel and witnesses, whereupon, and upon hearing and inquiry of the whole matter, the judicial committee may report to his Majesty that a further extension of the term in the said letters patent shall be granted, not exceeding seven years, and his Majesty is thereby authorized and empowered, if he shall think fit, to grant new letters patent for the said invention for a term not exceeding seven years after the expiration of the first term, any law, custom, or usage to contrary, notwithstanding; provided that no such extension shall be granted if the application by petition shal not be made and prosecuted with effect before the expiration of the term originally granted in such letters patent: And whereas it has happened since the passing of the said act, and may again happen, that parties desirous of obtaining an extension of the term granted in letters patent of which they are possessed, and who may have presented a petition for such purposes in manner by the said recited act directed, before the expiration of the said term, may nevertheless be prevented, by causes over which they have no control, from prosecuting with effect their application before the judicial committee of the privy council; and it is expedient therefore that the said judicial committee should have power, when under the circumstances of the case they shall see fit, to entertain such application, and to report thereon, according to the provisions of the said recited act, notwithstanding that before the hearing of the case before them the terms of the letters patent sought to be renewed or extended may have expired: Be it therefore enacted by the Queen's most excellent Majesty, by and with the advice and consent of the lords spiritual and temporal, and commons, in this present Parliament assembled, and by the authority of the same, that so much of the said recited act as provides that no extension of the term of letters patent shall be granted as therein mentioned if the application by petition for such extension be not prosecuted with effect before the expiration of the term originally granted in such letters patent, shall be and the same is hereby repealed. § 1.

Term of patent right may be extended in certain cases though the application for such extension not prosecuted with effect before the expiration thereof.—And be it further enacted, That it shall be lawful for the judicial committee of the privy council, in all cases where it shall appear to them that any application for an extension of the term granted by any letters patent, the petition for which extension shall have been referred to them for their consideration, has not been prosecuted with effect before the expiration of the said term, from any other causes than the neglect or default of the petitioner, to entertain such application, and to report thereon, as by the said recited act provided, notwithstanding the term originally granted in such letters patent may have expired before the hearing of such application; and it shall be lawful for Her Majesty, if she shall think fit, on the report of the said judicial committee recommending an extension of the term of such letters patent, to grant such extension, or to grant new letters patent for the invention or inventions specified in such original letters patent, for a term not exceeding seven years after the expiration of the term mentioned in the said original letters patent: provided always, that no such extension or new letters patent shall be granted if a petition for the same shall not have been presented as by the said recited act directed, before the expiration of the term sought to be extended, nor in case of petitions presented after November 30, 1839, unless such petition shall be presented six calendar months at the least before the expiration of such term, nor in any case unless sufficient reason shall be shewn to the satisfaction of the said judicial committee for the omission to prosecute with effect the said application by petition before the expiration of the said term. § 2.

Act may be amended this session.—And be it further enacted, That this act may by altered, amended, or repealed by any act to be passed in the present session. § 3.

On Warming and Ventilating Public Buildings and Apartments. *By* Charles Hood, F. R. A. S.*

The author first treats of the constitution of the atmosphere; the artificial changes produced in it, and the effect of these changes on animal economy. The researches of chemists shew that in atmospheric-air, uncontaminated by respiration or other means, there exists from 21.1 to 25.5

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* From the Transactions of the Society of Civil Engineers.

per cent. of oxygen, 78 per cent. of nitrogen, $\frac{1}{10}$ per cent. of carbonic-acid, and a small quantity of aqueous-vapour. Besides these there are many foreign matters insensible to chemical tests, but quite sensible to our organs, whereof many being easily decomposable by heat, are resolved into their constituent gases; to this fact is to be referred the wholesomeness and pleasantness of some artificial systems of heating, or the contrary. The hygrometric condition of the atmosphere is most remarkably affected by change of temperature, as the quantity of vapour in air of 52° F. may be estimated at $\frac{1}{160}$th of the weight of air, at 59° F. at $\frac{1}{80}$th, and 86° F. at $\frac{1}{40}$th; when then the temperature of the air within the room is considerably above that of the air without, this increased capacity for moisture is productive of effects prejudicial to the health. Moreover, if iron surfaces of too high temperature be present, the vapour may become decomposed, its oxygen combining with the iron, and the hydrogen becoming diffused through the atmosphere. Consequences prejudicial to health from these causes have been repeatedly experienced in rooms heated by a hot air cockle; these effects are not peculiar to the hot air cockle, but will result in a greater or less degree whenever artificial warmth is produced from iron surfaces, the temperature of which much exceeds 212° F. The dryness of the air may in some measure be remedied by moisture, distributed artificially, but the effects from the decomposition of the particles of matter cannot be obviated by any artificial means. The system of Mr. Bernhardt is peculiarly open to these objections, as the pipes nearest the fire must become intensely heated; as also the stoves introduced by Dr. Arnott; since, independent of the difficulty of keeping down the temperature of the metallic surface, carbonic-oxide is produced from the coke, and carburetted-hydrogen is also formed in the stove. The gas-stoves are also open to the same objections; moreover the quantities of water, of nitrogen, and of carbonic-acid gas evolved by the combustion of the gas are extremely deleterious. In the latter case aqueous-vapour will be in excess, and consequently the due quantity of perspirable matter is not carried off from the lungs and skin, the injurious effects of which have been clearly established by M. Quetelet in his work on man. The injurious effects of excess of nitrogen and carbonic-acid gas are too well known to require comment.

The author next treats of the best methods of warming buildings in order to secure a healthy state of the atmosphere; and having shewn the disadvantages of applying heat directly to any surfaces, he points out the method of applying it indirectly, as by steam or hot water, contained in iron-pipes: the latter is more economical and simple, affords greater permanence and equality, admits of a lower uniform temperature, and any form of heating surface. The temperature of the metallic surface rarely exceeds 180° F. and never reaches 212° F., which is too low to decompose in any appreciable degree the organic matter contained in the air. The only effect is to increase the capacity of the air for moisture, which is readily obviated. The surface which is intended to distribute the heat should be a good conductor and radiator, and the material which presents this combination in its highest degree is iron: the amount of heating surface which will be required depends on the building to be warmed, and on a great variety of circumstances; but as an approximate rule it may be laid down, that for a church, or similar public building, the cubic contents of the building divided by 200 will give the number of feet of surface requisite for a temperature of from 55° F. to 58° F. in the coldest weather ordinarily experienced in this country. The form of the heating surface is immaterial as regards the action of the apparatus, but the time requisite to obtain a given temperature, and the permanence of that temperature, depend on the mass of heated matter; the relative times of heating and cooling being inversely as the mass divided by the superficies. A rapid circulation of the water may be obtained by increasing the elevation of the pipes above the boiler, but it is considerably influenced by any alterations in the bore of the pipes. One great advantage in this apparatus is its perfect safety, as the water at some point is always open to the atmosphere, whereas in the system of hermetically sealed pipes, containing steam or hot water under the pressure of from ten to fifty atmospheres, this security can never exist.

3.—The author lastly treats of ventilation; a subject of the greatest importance, independent of the changes already alluded to as produced in the atmosphere by overheated surfaces, since all air respired from the lungs is found to have lost a proportion of its oxygen, and to have acquired a proportion of carbonic-acid gas and vapour, and the quantity of air which will require to be changed may be taken at 3½ cubic feet per minute for each person a room contains. The author dwells at considerable length on the physiological effects consequent on these changes, and details several striking instances of the great advantages resulting from improved ventilation, in places which had previously been unhealthy. All ventilation may be placed in one of two classes, the natural or the mechanical; in the former, the excess of temperature of the air is the *primum mobile* of the efflux, and the rapidity of the discharge may be much increased by artificially raising the temperature of the discharging pipe. Ventilation by mechanical means, as by pumps, or by fans rotating with a great velocity, may be most advantageously employed, wherever mechanical power is used for other purposes; the great efficacy of this latter mode is proved most unquestionably by the experience of the manufacturing districts. The former method has recently been tried on a very large scale at the House of Commons, and it is calculated by Dr. Ure that thirty-eight times more fuel is expended in producing the same effect by chimney draughts than by mechanical power. It appears, however, that the natural method of ventilation, by the spontaneous effusion of the heated air, through openings in the ceiling, is the best calculated for ordinary purposes; but that in all extraordinary cases ventilation by some mechanical means is the only economical and efficacious method.

NOTICE OF EXPIRED PATENTS.

(*Continued from vol. xi. p.* 251.)

George Augustus Lamb, of Rye, Sussex, Doctor of Divinity, for a new composition of malt and hops.—Sealed February 10, 1825.—(*For copy of specification, see Repertory, Vol.* 4, *third series, p.* 193.)

Richard Badnall the younger, of Leek, Staffordshire, Silk Manufacturer, for certain improvements in winding, doubling, spinning, throwing, or twisting of silk, wool, cotton, or any other fibrous substances.—Sealed February 10, 1825.

John Heathcoat, of Tiverton, Devonshire, Lace Manufacturer, for certain improvements on the method or methods of manufacturing silk.—Sealed February 11, 1825.

Edward Lees, of Little Thurrock, Essex, Publican, for certain improvements in water-works, and in the mode of conveying water, for the purpose of flooding and draining lands, which said improvements are also applicable to various other purposes.—Sealed February 19, 1825.

Thomas Masterman, of the Dolphin Brewery, 38, Broad Street, Ratcliffe, Middlesex, Common Brewer, for an apparatus for bottling wine, beer, and other liquids, with encreased economy and dispatch. —Sealed February 19, 1825.—(*For copy of specification, see Repertory, Vol.* 1, *third series, p.* 150.)

Edmund Lloyd, of North End, Fulham, Middlesex, Gentleman, for a new apparatus from which to feed fires with coals and other fuel.—Sealed February 19, 1825.

Benjamin Farrow, of Great Tower Street, London, Ironmonger, for an improvement or improvements in buildings, calculated to render them less likely to be destroyed or injured by fire than heretofore.—Sealed February 19, 1825.

Jesse Ross, of Leicester, Hosier, for a new apparatus for combining and strengthening wool, cotton, and other like fibrous substances.—Sealed February 19, 1825.

Jacob Mould, of Lincoln's Inn-fields, Middlesex, Gentleman, for certain improvement in fire-arms. Commudicated by a foreigner residing abroad.—Sealed February 19, 1825.

Henry Burnett, of Arundel, Sussex, Gentleman, for certaim improvements in machinery for a new rotatory or endless lever action. Communicated by persons residing abroad.—Sealed February 19, 1825. —(*For copy of specification, see Repertory, Vol.* 3, *third series, p.* 327.)

John Beacham, of Paradise Street, Finsbury Square, Middlesex, Cabinet Maker, for certain improvements in water-closets.—Sealed February 19, 1825.

James Ayton, of Trowse Millgate, Norfolk, Miller, for an improvement, or spring to be applied to bolting-mills, for the purpose of facilitating and improving the dressing of flour and other substances.—Sealed February 19, 1825.—(*For copy of specification, see Repertory, Vol.* 2, *third series, p.* 19.)

David Edwards, of King Street, St. George, Bloomsbury, Middlesex, Writing Desk and Dressing Case Manufacturer, for an ink-stand, which is so constructed, that by means of pressure the ink is caused to flow to use.—Sealed February 26, 1825.

Joseph Manton, of St. George, Hanover Square, Middlesex, Gun Maker, for certain improvements in fire-arms.—Sealed February 26, 1825.

William Hopkins Hill, of Woolwich, Kent, Lieutenant in the Royal Artillery, for certain improvements in machinery for propropelling vessels.—Sealed February 26, 1825.—(*For copy of specification, see Repertory, Vol.* 2, *third series, p.* 1.)

George Augustus Kollmann, of the Friary, St. James's Palace, Middlesex, Professor of Music, for certain improvements in the mechanism and general construction of piano-fortes.—Sealed February 26, 1825.

John Heathcoat, of Tiverton, Devonshire, Lace Manufacturer, for an improved method of producing figures or ornaments in or upon a certain description or kind of goods manufactured from silk, cotton, flax, or other thread or yarn.—Sealed February 26, 1825.—(*For account of specification, see Repertory, Vol.* 1, *third series, p.* 359.)

Jonas Bateman, Upper Street, Islington, Middlesex, Fruiterer, for a portable life-boat.—Sealed February 26, 1825.

Cornelius Whitehouse, of Wednesbury, Staffordshire, White-Smith, for certain improvements in manufacturing tubes for gas and other purposes.—Sealed February, 26, 1825.

Thomas Attwood, of Birmingham, Warwickshire, Manufacturer, for an improved method of making a nib or nibs, slott or slotts, in copper cylinders, or cylinders of other metal, used for printing cottons, linen, silk, stuffs, and other articles.—Sealed February 26, 1825.

David Gordon, of Basinghall Street, London, Esquire, and **Wil-**

LIAM BOWSER, of Parson's Street, Wellclose Square, Middlesex, Iron Manufacturer, for certain improvements in uniting and plating, or coating, iron with copper, or with any other composition whereof copper is the principal ingredient.—Sealed February 26, 1825.—(*For copy of specification, see Repertory, Vol.* 3, *third series, p.* 193.)

CHEVALIER JOSEPH DE METTEMBERG, of Foley Place, St. Mary-le-bone, Middlesex, Physician, late Surgeon-Major in the French armies, for a vegetable, mercurial, and spirituous preparation, which he denominates, Quintessence Antipsorique, or Mettemberg's Water; and also a particular method of employing the same by cutaneous absorption, as a specific and medical cosmetic.—Sealed February 26, 1825.

JOHN MASTERMAN, of 68, Old Broad Street, London, Gentleman, for an improved method of corking bottles—Sealed March 5, 1825.—(*For copy of specification, see Repertory, Vol.* 1, *third series, p.* 302.)

ABRAHAM HENRY CHAMBERS and ENNIS CHAMBERS, both of Stratford Place, St. Mary-le-bone, and CHARLES JERRAUD, of Adam Street, Manchester Square, Middlesex, Esquires, for a new filtering apparatus.—Sealed March 5, 1825.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 377.)

WILLIAM HALLEY, of Holland Street, Blackfriars Road, Surrey, Iron Founder and Blowing Machine Maker, for certain improvements in the construction of forges, and on bellows or apparatus to be used therewith or separate.—Sealed March 5, 1825.—(*For account of specification, see Repertory, Vol.* 1, *third series, p.* 118.)

ROBERT WINCH, of Steward's Building, Battersea Fields, Surrey, Engineer, for certain improvements in, or additions to, rotatory pumps, for raising and forcing water or other liquids.—Sealed March 5, 1825.

WILLIAM HENRY JAMES, of Cobourg Place, Winson Green, near Birmingham, Warwickshire, Engineer, for certain improvements on railways, and in the construction of carriages to be employed thereon.—Sealed March 5, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 59.)

WILLIAM HIRST and JOHN WOOD, both of Leeds, Yorkshire, Manufacturers, for certain improvements in cleaning, milling, or fulling cloth.—Sealed March 5, 1825.

JOHN LINNEL BOND, of Newman Street, Mary-le-bone, Middlesex, Architect, and JAMES TURNER, of Wells Street, Mary-le-bone, aforesaid, Carpenter and Builder, for certain improvements in the construction of windows, casements, folding-sashes (usually called French sashes), and doors, by means of which the same are hung and hinged in a manner adapted more effectually to exclude rain and wind, and to afford a free circulation of air.—Sealed March 9, 1825.

—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 256.)

Thomas Hancock, of Goswell Mews, St. Luke, Old Street, Middlesex, Patent Cork Manufacturer, for a new or improved manufacture, which may in many instances be used as a substitute for leather, and otherwise.—Sealed March 15, 1825.—(*For copy of specification, see Repertory, Vol.* 3. *third series, p.* 129.)

Thomas Hancock, of Goswell Mews, St. Luke, Old Street, Middlesex, Patent Cork Manufacturer, for an improvement or improvements in the making or rendering ships' bottoms, vessels, and utensils of different descriptions and various manufactures, and porous or fibrous substances, impervious to air and water, and for coating and protecting the surfaces of different metallic and other bodies.—Sealed March 15, 1825.

Thomas Hancock, of Goswell Mews, St. Luke, Old Street, Middlesex, Patent Cork Manufacturer, for an improvement or improvements in the preparation, or in the process of making or manufacturing of ropes or cordage and other articles from hemp, flax, and fibrous substances.—Sealed March 15, 1825.—(*For copy of specification, see Repertory, Vol.* 2, *third series, p.* 359.)

John Collinge, of Lambeth, Surrey, Engineer, for an improvement or improvements on springs and other apparatus used for closing doors and gates.—Sealed March 15, 1825.

Robert Bretell Bate, of the Poultry, London, Optician, for an improvement on the frames of eye-glasses.—Sealed March 15, 1825. —(*For copy of specification, see Repertory, Vol.* 3, *third series, p.* 2.)

Henry Nunn and **George Freemann**, of Blackfriars Road, Surrey, Lace Manufacturers, for certain improvements in machinery for making that sort of lace commonly known by the name of bobbinnet.—Sealed March 15, 1825.

Samuel Brown, of Saville Row, Burlington Street, Middlesex, Commander in the Royal Navy, for an apparatus for giving motion to vessels employed in inland navigation.—Sealed March 15, 1825. —(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 61.)

Joseph Barlow, of the New Road, St. George, Middlesex, Sugar Refining, for a method or process for bleaching and clarifying, and improving the quality and colour of sugars, known by the name of bastard and piece sugars.—Sealed March 15, 1825.—(*For copy of specification, see Repertory, Vol* 3, *third series, p.* 65.)

William Grisenthwaite, of King's Place, Nottinghamshire, Gentleman, for an improvement in air-engines.—Sealed March 15, 1825.

Richard Whitechurch and **John Whitechurch**, of Star Yard, Carey Street, Chancery Lane, Middlesex, Carpenters, for an improvement upon hinges, which may be made of iron, steel, brass, or other metals, for doors, cupboards, and sashes of houses, sashes of book-cases, and shew cases, and are applicable to all purposes where hinges are used, and particularly to the doors and windows of ships, vessels, steam-boats, and other craft, which will enable the doors and sashes to be opened on the right and left jaumb (changing the hinges), and if required they can be fitted either with or without a rising hinge.—Sealed March 17, 1825.

MARK COSNAHAN, of the Isle of Man, Esquire, for a new apparatus for ascertaining the way and lee-way of ships and other vessels, which apparatus is also applicable to other useful purposes.—Sealed March 17, 1825.—(*For account of specification, see Repertory, Vol. 2, third series, p.* 394.)

ROBERT HICKS, of Conduit Street, Middlesex, Surgeon, for an improved bath.—Sealed March 22, 1825.

FRANCIS RONALDS, of Croydon, Surrey, Esquire, for a new tracing apparatus, to facilitate the drawing from nature.—Sealed March 23, 1825.

RICHARD WITTY, of Kingston-upon-Hull, Sculcoates, Yorkshire, Civil Engineer, for an improvement in the method of lighting by gas, by reducing the expense thereof.—Sealed March 25, 1825.

JOHN MARTIN HANCHETT, of Crescent Place, Blackfriars, London, and JOSEPH DELVALLE, of Whitecross Street, St. Luke, Middlesex, Esquire, for an improvement or improvements in looms for making cloths, silks, and different kinds of woollen stuffs of various breadths. Communicated by a foreigner residing abroad.—Sealed March 25, 1825.

JOSEPH MANTON, of Hanover Square, Middlesex, Gun Maker, for a certain improvement in shot.—Sealed March 25, 1825.—(*For copy of specification, see Repertory, Vol.* 1, *third series, p,* 387.)

JOHN GOTTLIEB ULRICH, of Bucklesbury, Cheapside, London, Chronometer Maker, for certain improvements on chronometers.—Sealed March 26, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 448.)

AARON JENNENS and JOHN BELLERIDGE, both of Birmingham, Warwickshire, Manufacturers and Japanners in ordinary, for certain improvements in the method or methods of preparing and working pearl-shell into various forms and devises, for the purpose of applying it to ornamental uses, in the manufacture of japan ware, and other wares and articles to which the same can be applied.—Sealed March 29, 1825.

(*To be continued*).

PATENTS GRANTED FOR SCOTLAND,

From March 18, *to June* 18, 1839.

Samuel Clegg, of Sidmouth Street, Gray's Inn Road, in the county of Middlesex, Engineer, for a new improvement in valves, and the combination of them with machinery.—Sealed March 18, 1839.

John Leigh, of Manchester, in the county of Lancaster, Surgeon, for an improved mode of obtaining carbonate of lead, commonly called white-lead.—Sealed March 18, 1839.

Joseph Bennet, of Turnlee, near Glossop, in the county of Derby, Cotton Spinner, for certain improvements in the machinery for carding, drawing, slubbing, roving, and spinning silk, wool, cotton, worsted, flax, and other fibrous substances, which improvements are also paplicable to other useful purposes.—Sealed March 20, 1839.

John Player, the younger, of Loughour, near Swansea, in the county of Glamorgan, Engineer, for improvements in furnaces and fire-places for consuming anthracite and other fuel, for generating steam, evaporation, smelting and heating iron and other metals.—Sealed March 21, 1839.

John Robinson, of North Shields, in the county of Northumberland, Engineer, for a nipping lever for causing the rotation of wheels, shafts, or cylinders, under certain circumstances.—Sealed March 22, 1839.

James Gardner, of Banbury, in the county of Oxford, Ironmonger, for improvements in cutting Swedish turnips, mangel-wurzel, and other roots used for food for sheep, horned cattle, and other animals.—Sealed March 25, 1839.

George Cottam, of Winsley Street, Oxford Street, in the county of Middlesex, Engineer, for improvements in the construction of wheels for railway and other carriages.—Sealed March 25, 1839.

Richard Roberts, of Manchester, in the county palatine of Lancaster, Civil Engineer, an extension of seven years, from April 5, 1839, of a patent granted to him for an improvement, or certain improvements of, in, or applicable to, the mule, binney, jenny, stretching frame, or or any other machine or machines, however designated or named, used in spinning cotton, wool, or other fibrous substances, and in which either the spindles recede from and approach the rollers or other deliverers of the said fibrous substances, or in which such rollers or deliverers recede from and approach the spindles.—Sealed March 25, 1839.

Andrew Smith, of Prince's Street, Leicester Square, in the county of Middlesex, Engineer, for certain improvements in apparatus for heating fluids and generating steam.—Sealed March 27, 1839.

Wilton Wood, of Liverpool, in the county of Lancaster, Merchant, for improved methods of making bands and tackling, to be used in driving, turning, or carrying machinery.—Sealed March 27, 1839.

John Ruthven and Morris West Ruthven, of Edinburgh, Civil Engineers, for improvements in boilers for generating steam, in economizing fuel, in propelling vessels by steam or other power, and ventilating vessels, and which may be applied to mines or buildings.—Sealed March 28, 1839.

John Gray, of Liverpool, in the county of Lancaster, Engineer, for certain improvements in steam-engines, and apparatus connected therewith; which improvements are particularly applicable to marine engines for propelling boats or vessels; and part or parts of which improvements are also applicable to locomotive and stationary steam-engines, and other purposes.—Sealed March 29, 1839.

William Hale, of Greenwich, in the county of Kent, for improvements in steam-engines, and apparatus connected therewith, and in machinery for propelling vessels, part of which improvements are applicable to raising or forcing fluids.—Sealed April 2, 1839.

William Henry Porter, of Russia Row, Milk Street, Cheapside, in the city of London, Warehouseman, for improvements in anchors.—Sealed April 2, 1839.

Thomas Adamson, of Dundee, in the county of Forfar, North Britain, Ship Builder, for certain improvements in the machinery employed in turning windlasses.—Sealed April 2, 1839.

Robert Logan, of Trafalgar Square, in the county of Middlesex, for a new cloth or cloths constructed from cocoa-nut fibre, and certain improvements in preparing such fibrous material for the same and other purposes.—Sealed April 3, 1839.

John Bourne, of the city of Dublin, Engineer, for certain improvements in steam-engines, and in the construction of boilers, furnaces, and stoves.—Sealed April 16, 1839.

Job Cutler, of Lady Poole Lane, Spark Brook, in the parish of Aston, in the borough of Birmingham, in the county of Warwick, Gentleman, for improvements in combination of metals applicable to the making of tubes or pipes, and to other purposes, and in the method or methods of making tubes or pipes therefrom; which improved method or methods is or are applicable to the making of tubes or pipes, from certain other metals and combinations of metals.—Sealed April 17, 1839.

John Woolrich, Birmingham, in the county of Warwick, Professor of Chemistry, for an improved process of manufacturing carbonate of lead, commonly called white-lead.—Sealed April 17, 1839.

John Hillard, for certain improvements in machinery or apparatus for making or manufacturing screws. Communicated by a foreigner residing abroad.—Sealed April 24, 1839.

James Nasmyth, of Patricroft, near Manchester, in the county of Lancaster, Engineer, for certain improvements applicable to the bearings or journals of locomotive and other steam-engines; which improvements are also applicable to the bearings or journals of machinery in general.—Sealed April 24, 1839.

George Price, of Cornhill, in the city of London, Gentleman, for improvements in filtering and clarifying water and other liquids. Communicated by a foreigner residing abroad.—Sealed April 30, 1839.

William Pontifex, of Shoe Lane, in the city of London, Coppersmith, for improvements in apparatus or materials employed in filtering and clarifying water and other liquids.—Sealed April 30, 1839.

James Smith, of Deanston Works, in the parish of Kilmadock, in the county of Perth, Cotton-Spinner, for certain improvements in the machinery for spinning and twisting of wool and other similar fibrous substances.—Sealed April 30, 1839.

Thomas Barnabas Daft, of Regent Street, in the county of Middlesex, Gentleman, for certain improvements in inkstands, and in materials and apparatus for fastening and sealing letters.—Sealed April 30, 1839.

Elisha Haydon Collier, late of Boston, in the United States of North America, but now of Globe Dock Factory, Rotherhithe, in the county of Surrey, Civil Engineer, for improved machinery in manufacturing nails.—Sealed April 30, 1839.

Mathew Heath, of Furnival's Inn, Gentleman, for improvements in clarifying and filtering water, beer, wine, and other liquids. Communicated by a foreigner residing abroad.—Sealed April 30, 1839.

James Whitelaw, of Glasgow, in the county of Lanark, North Britain, Engineer, for an improved rotatory machine to be worked by the pressure and re-action of a column of water, which machine may be used as a steam-engine; also an improved water meter, and a machine for raising water or other liquid by its centrifugal force.—Sealed May 17, 1839.

William Watson, of Temple Street, in the county of Dublin, Gentleman, for an improvement in the construction of ships, and which improvement is also applicable to all kinds of sea-going vessels; and also certain improvements in the construction of boats and other vessels intended to be used on canals and inland navigations.—Sealed May 20, 1839.

Joseph Amesbury, of Burton Crescent, in the parish of St. Pancras, in the county of Middlesex, Surgeon, for a certain apparatus, or an improvement or improvements in apparatus, for the support of the human body.—Sealed May 24, 1839.

John Henfrey, of Weymouth Terrace, in the parish of Shoreditch, and county of Middlesex, Engineer and Machinist, for certain improvements in the manufacture of hinges or joints, and in the machinery employed therein.—Sealed May 29, 1839.

John Boyd, of College Street South, and **Hugh Francis Rennie**, of Glengall Street, both in the town of Belfast, and in the county of Antrim, Flax Spinners, for certain improvements upon the spinning frame used for spinning flax, hemp, and tow, upon the wet principle.—Sealed May 29, 1839.

John Williamson Whittaker, of Bolton, in the county of Lancaster, Joiner, and **Rowland Hall Heaton**, of the same place, Cotton Spinner, for certain improvements in the means of connecting or uniting straps or bands for driving machinery and other similar purposes, and in the apparatus for effecting the same.—Sealed May 30, 1839.

James Drew, of Manchester, in the county of Lancaster, Civil Engineer, for certain improvements in the means of consuming smoke and economizing fuel in steam-engines or other furnaces or fire places.—Sealed May 31, 1839.

John George Bodmer, of Manchester, in the county of Lancaster, Engineer, for certain improvements in the machinery for carding, drawing, roving, and spinning cotton, wool, flax, silk, and other fibrous substances.—Sealed June 5, 1839.

Edward Pearson Tee, of Barnsley, in the county of York, Dyer and Linen Manufacturer, for improvements in weaving linen and other fabrics.—Sealed June 6, 1839.

William Hickling Burnett, of Wharton Street, Bagnigge Wells Road, in the county of Middlesex, Gentleman, for improved machinery for cutting or working wood.—Sealed June 12, 1839.

John Roberts, of Manchester, in the county of Lancaster, Machine Maker, for certain improvements in machinery or apparatus for planing or cutting metals.—Sealed June 14, 1839.

George Nelson, of Leamington Prior, in the county of Warwick, Gentleman, for a certain new or improved method, or new or improved methods, of preparing gelatine, which has the properties of, or resembles, glue.—Sealed June 17, 1839.

William Morgan, of New Cross, in the county of Surrey, Gentleman, for improvements in the generation of steam.—Sealed June 17, 1839.

William Whitham, of Huddersfield, in the county of York, Machinist, for improvements in engines to be worked by steam, water, or other fluids.—Sealed June 17, 1839.

Alexander Francis Campbell, of Great Plumstead, in the county of Norfolk, Esquire, and Charles White, in the city of Norwich, Mechanic, for certain improvements in ploughs, harrows, scarifiers, cultivators, and horse-hoes.—Sealed June 17, 1839.

Charles Andrew Caldwell, of Audley Square, in the county of Middlesex, Esquire, for improvements in furnaces and apparatus for applying the heat of fuel. Communicated by a foreigner residing abroad.—Sealed June 18, 1839.

LIST OF NEW PATENTS.

William Colchester, of Ipswich, Merchant, for an improved soap frame.—Sealed July 29, 1839.—(*Six months.*)

Christopher Nickels, of York Road, Lambeth, Gentleman, for improvements in cutting Indian-rubber.—Sealed August 1, 1839.—(*Six months.*)

Louis Francois Feuillet, of George Yard, Lombard Street, Gentleman, for improvements in casting type for printing.—Sealed August 1, 1839.—(*Six months.*)

Samuel Sidney Smith, of Suffolk Place, Hackney Road, for certain improvements in machinery for raising water.—Sealed August 1, 1839.—(*Six months.*)

Joseph Webb, of Huddersfield, for improvements in machinery for raising the pile of woollen and other cloths.—Sealed August 1, 1839.—(*Six months.*)

Alphonse Rene Le Mire De Normandy, of Cheapside, Doctor in Medicine, for certain improvements in the manufacture of inks and dyes.—Sealed August 1, 1839.—(*Six months.*)

William Abbott, junior, of Wyndham Place, Middlesex, Gentleman, for improvements in the manufacture of felt.—Sealed August 1, 1839.—(*Six months.*)

Thomas Knowles, of Manchester, Cotton Spinner, for certain improvements in machinery or apparatus used in the preparation of cotton and other fibrous substances.—Sealed August 1, 1839.—(*Six months.*)

William Miller, of Clithero, Lancaster, Engineer, for certain improvements in grates used in steam-engines or other furnaces or fire places.—Sealed August 1, 1839.—(*Six months.*)

Pierre Jacques Ferier, of No. 5, Paul's Chain, Saint Paul's Church Yard, Jeweller, for certain improvements in the construction of vapour and hot-air baths.—Sealed August 1, 1839.—(*Six months.*)

Samuel Guppy, of the City of Bristol, Merchant, for improvements in a certain process and apparatus used in the manufacture of soap.—Sealed August 1, 1839.—(*Six months.*)

William Morrett Williams, of Bedford Place, Commercial Road, for an improved lock and key.—Sealed August 1, 1839.—(*Four months.*)

John Humphries, of Kidderminster, Carpet Manufacturer, for certain improvements in the manufacture of carpets and rugs. — Sealed August 1, 1839.—(*Six months.*)

John Mercer, of Oakenshaw, in the County of Lancaster, Calico Printer, **John Dyneley Prince**, the younger, of Manchester, Calico Printer, and **William Blythe**, of Church, in the said County, Manufacturing Chemist, for certain improved processes to be used in the printing, dyeing, or colouring of cotton, woollen, silk, or other cloths and yarns.—Sealed August 1, 1839.—(*Six months.*)

Sir John Scott Lillie, of Kensington, Knight, for certain improvements in the application of elastic fluids to the working of machinery.—Sealed August 1, 1839.—(*Six months.*)

John Moore, of Broad Weir, Bristol, Gentleman, for an improvement or improvements in the steam-engine or steam-engine apparatus.—Sealed August 5, 1839.—(*Six months.*)

Jonathan Fell, of Workington, Cumberland, for improvements in building ships and other vessels.—Sealed August 5, 1839.—(*Six months.*)

Robert William Jearrard, of Oxford Street, Architect, for certain improved means of retarding wheeled carriages.—Sealed August 6, 1839.—(*Six months.*)

Joseph Whitworth, of Manchester, Engineer, for certain improvements in machinery, tools, or apparatus, for planeing, boring, and cutting metals or other substances. —Sealed August 7, 1839.—(*Six months.*)

Thomas Burr, of Shrewsbury, Lead Merchant, for improvements in rolling lead and other soft metals.—Sealed August 8, 1839.—(*Six months.*)

John Fitzpatrick, of Stanhope Street, Clare Market, Gentleman, for a new and improved method of making and manufacturing thread and linen, by means of a material not hitherto used for that purpose. Communicated by af oreigner residing abroad.—Sealed August 10, 1839.—(*Six months.*)

Robert Varicas, of Burton Crescent, Middlesex, Surgeon, for improvements in rendering fabrics and leather water proof.—Sealed August 10, 1839.—(*Six months.*)

Nelson John Holloway, of Pentonville, Gentleman, for an improved head for carriages. Communicated by a foreigner residing abroad.—Sealed August 13, 1839.—(*Six months.*)

Henry Brown, of Mile End, fora new covering or plating for household furniture, picture frames, cabinet and fancy work and other articles of domestic and personal use and the mode of making such covering or plating.—Sealed August 13, 1839.—(*Six months.*)

Miles Berry, of Chancery Lane, Middlesex, for a new or improved method of obtaining the spontaneous reproduction of all the images received in the focus of the camera obscura. Communicated by a foreigner residing abroad.—Sealed August 14, 1839.—(*Six months.*)

James Capple Miller, of Manchester, Gentleman, for certain improvements in printing calicoes, muslins, and other fabrics.—Sealed August 15, 1839.—(*Six months.*)

John Mason, of Rochdale, Machine Maker, for certain improvements in machinery or apparatus for boring and turning metals and other substances.—Sealed August 15, 1839.—(*Six months.*)

William Bridges Adams, of Porchester Terrace, Bayswater, Gentleman, and John Buchannan of Glasgow, Coach Builder, for certain improvements in the construction of wheel carriages, parts of which improvements are also applicable to machinery for propelling and also for the purpose of securing ships and other vessels, and for communicating motion between different portions of machinery.—Sealed August 16, 1839.—(*Six months.*)

Joseph Schofield, of Littleborough, Lancaster, Cotton Spinner, and **Edmund Leach**, of Littleborough, aforesaid, Manager, for certain improvements in looms for weaving various kinds of cloth.—Sealed August 17, 1839. —(*Six months.*)

Matthew Uzielli, of King William Street, London, Merchant, for improvements in the modes of impregnating wood or timber with chemical materials. Communicated by a foreigner residing abroad.—Sealed August 17, 1839. —(*Six months.*)

George Augustus Kollman, Organist of Her Majesty's German Chapel, Saint James, for improvements in railways and in locomotive and other carriages.—Sealed August 17, 1839.—(*Six months.*)

James Vardy, of Wolverhampton, Gentleman, and **Moritz Platow**, of Poland Street, Oxford Street, Engineer, for improvements in making decoctions of coffee and other matters.—Sealed August 17, 1839.—(*Six months.*)

Stephen Joyce, of Croydon, Surrey, Artist, for certain improvements in stoves for warming the air in buildings, which improvements are also applicable for cooking or for communicating heat for other useful purposes.—Sealed August 21, 1839.—(*Six months.*)

Moses Poole, of Lincoln's Inn, Gentleman, for improvements in introducing elastic materials into fabrics, to render them elastic or partly elastic.—Communicated by a foreigner residing abroad.—Sealed August 23, 1839. (*Six months.*)

William Coles, of Charing Cross, Middlesex, Esquire, for improvements in reducing friction of machinery used in propelling vessels, lathes, and other machines.—Sealed August 23, 1839.—(*Six months.*)

Charles Barwell Coles, of Allsop Terrace, New Road, Gentleman, for improvements in the method of fixing and carrying fire-arms on horseback.—Sealed August 23, 1839.—(*Six months.*)

John Augustus Tulk, of Lenton and Lowca Iron Works, Cumberland, Iron Master, for improvements in the manufacture of iron.—Sealed August 26, 1839.—(*Six months.*)

Henry Pinkus, of Old Slaughter's Coffee House, Saint Martin's Lane, Gentleman, for improvements in the methods of applying motive power to the impelling of machinery, which improvements are applicable to several useful purposes.—Sealed August 26, 1839.—(*Six months.*)

James Bogardus, of Trinity Square, Tower Hill, Gentleman, for improved means of applying labels, stamps, or marks to letters and such other documents.—Sealed August 26, 1839.—(*Six months.*)

Thomas Mac Gauran, of Golden Terrace, Pentonville, for improvements in the manufacture of paper from a material not hitherto so employed.—Sealed August 26, 1839. (*Six months.*)

John Muir, Jun., Merchant, of Glasgow, for certain improvements in the apparatus connected with the discharging-press, for conducting, distributing, and applying the discharging liquors, and the dyeing liquors.—Sealed August 26, 1839.—(*Six months.*)

LITERARY NOTICE.

In the Press, and nearly ready for Publication,

A Few Minutes' Advice to Deaf Persons; comprising, also, Useful Information for the Professional World. Being an Exposition of the Fallacy and Inconsistency of the Practice of Deleau, Kramer, and their Imitators in England or America. With Inquiries into the Rationality of the Treatment pursued by Aurists, Explanations relative to Specifics, Popular Remedies, the so-called "Voice-Conductors," &c. By a Surgeon-Aurist, of nearly thirty years practical experience.

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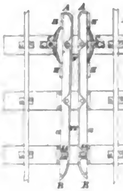
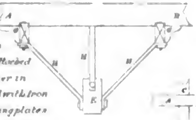
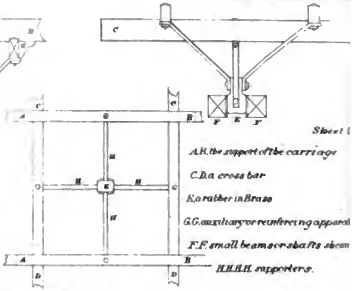


Sheet 1

A B, A B small beams or shafts forming an angle which will open by the introduction of the rubber E in pressing on the Springs C C & remaining attached to the pivots D D. E is a rubber in Brass or in Wood provided with Iron plates for friction. F rubbing plates of the small Iron beams or shafts. G G supporters for the springs. H H H H a piece which receives & guides the extremity of the Springs. a a the position where the distance between the small shafts is equal to the breadth of the rubber.





Sheet I

A B, the support of the carriage

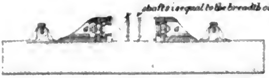
C D, a cross bar

E, a rubber in Brass

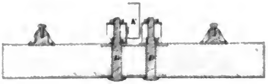
G G, auxiliary or reinforcing apparat

F F, small beams or shafts show

H H H H, supporters.

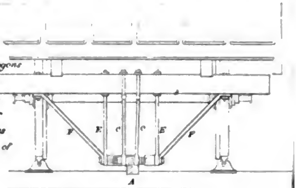


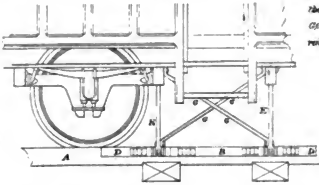
DE BERGUE'S PATENT

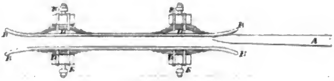


Sheet III

A cheek rail in Brass or in Wood with Iron or Brass bars for friction. B B, rubbing plates hanging from the waggons. C C, suspending branches of the rubbing plates. D D, springs by which the friction is produced. F F F F, branches which bear the Springs. E E, supporters of the Springs. G G, supporters intended against the action of rubbing plates on the uninterrupted rail.







PLAYER'S PATENT.

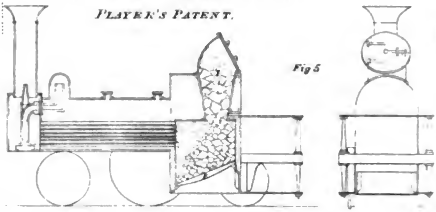


Fig 5

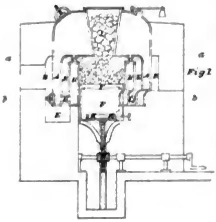


Fig 1

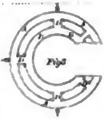


Fig 3

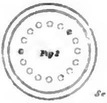


Fig 2

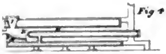


Fig 4

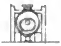
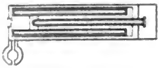


Fig 4



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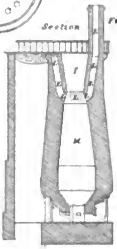


Section

Fig 8

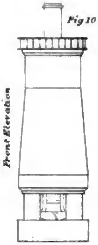
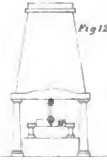


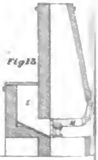
Fig 10

Front Elevation



Front Elevation

Fig 12



Section

Fig 13

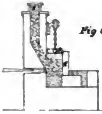


Fig 6

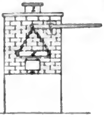
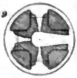
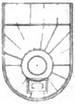


Fig 7



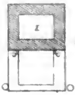
Plan

Fig 9



Top View

Fig 11



Plan

Fig 14

LONDON Hodson 112 Fleet Street October 1. 1839.

THE REPERTORY OF PATENT INVENTIONS.

No. LXX. NEW SERIES.—OCTOBER, 1839.

Specification of the Patent granted to EUGENE VISCOUNT DE BEURET, *of No.* 28, *Moorgate Street, in the City of London, for certain Improvements in the Construction of Rail-Roads and Tram-Roads to facilitate the Ascent and Descent of Hills and inclined Planes.*— Sealed August 10, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Eugene de Beuret, do hereby declare, that the principle of the said invention consists in providing for the wheels of the locomotive-engine on rail-roads and tram-roads, a bed or course distinct from the rails laid down for the train, and of a more adhesive character, whereby the engine and trains are enabled to surmount hills and inclined planes; and also in the application of an apparatus for moderating the tendency to accelerated swiftness in the engines and trains, when descending hills and inclined planes. If it were possible in rail-roads, to render the power of the locomotive-engines so effective that they might ascend inclined planes of a greater inclination than five in 1000, which at present is the maximum, and were it also possible, by means of a check superior in power to the common drag, to go down hill without danger, the expense now incurred by windings, clearings, fillings-in, cuttings, viaducts, tunnels, and otherwise, would be henceforward saved. Or, if the traffic on rail-roads were such as to render a large outlay of capital of no importance, there would still be an augmentation of interest, resulting from the capability of the locomotive-engine to drag trains of greater length and weight up such hills and inclined planes as are to be formed. Moreover, in many cases, the expense and inconveniences of fixed engines would be avoided, and in descents the lives of passengers would no longer be exposed to the chance of a broken chain. The means for ascending and descending must necessarily vary in their details, according to the command of money and resources, as well as the locality. The less adhesion there is between the wheels of train-carriages or rail-roads or tram-ways, and the road itself, the lighter will be the draught, and the greater the expedition, but for the locomotive the absence of friction is not always desirable. At present let the ascent in rail-roads be ever so trifling, the locomotive-engine loses its hold, and even on a level ground its power is affected whenever from any cause the rails have become slippery, and the wheels have even been known to revolve without producing any progress to the carriage. This circumstance is owing to the wheels of the engine having too smooth a surface to run on. To avoid this inconvenience, I place the train of carriages and waggons upon the iron rails, because the rails cannot be too slippery for the load, but in order to increase the dragging power of the working wheels of the locomotive-carriages, I furnish the locomotive-engine with separate rails of a substance of such a nature, and so disposed, as to cause the working wheels of the engine to have a firmer grasp than they can have upon the iron surface on which the train runs. On ordinary roads, the horse, which is there the moving power, has a firm footing, but there is too much resistance offered to the carriage. On railways, on the other hand, the progress of the train is easy, but the hold of the engine is defective. The plan which I have devised, will at once give the motor the resisting surface which suits its action, and the load, the gliding surface best adapted to its easy transport. The peculiar rails which I propose for the engines, and which may be used either on inclined planes only or throughout the whole line of road as circumstances require, vary according to the weight of the train, its velocity, the local materials for construction, and the expense to be incurred. They may be made of granite stone, bituminous cement, or of a layer of hard materials, such as are usually employed in making roads, or of blocks of wood well pitched, placed either lengthwise or in an upright position, and faced with small pebbles or metallic plates less hard than iron, and the materials last spoken of may be introduced in the groove of rails made for the purpose, either of cast-iron or other suitable substance. The adhesive rails or bed in question need not be broad, since the friction depends on pressure, and not on extent of surfaces. Their construction varies according to the construction of the working-wheels of the engine, which I proceed to describe. The purpose may be effected in several ways, first, by giving two diameters to the wheels of the locomotive-engine, the smaller one serving for the ascents. The two adhesive rails need not be above a few inches broad, and may be laid down outside of the two iron rails, and then the track for the locomotive-engine will be broader than that for the waggons; certainly an advantage, since it will be possible thereby to make the locomotive-engine more efficient, particularly as this requires to be more stable than the waggons. But in this case the adhesive rails will also be necessary on level ground as well as on the inclined planes themselves.

Secondly, the adhesive rails outside the wheels of the locomotive-engine may be provided with fellies broad enough to bear upon the iron rails, if on level ground, and upon the adhesive rails, if passing on inclined planes; and, with this view the adhesive rails must be raised a few inches above the level of the iron rails, and the ascent at the commencement must be gradual to admit of the outer wheel rising to the level of the adhesive rails.

Thirdly, in allowing the same distance to exist between the rails, as well for the locomotive as for the waggons, one of the adhesive rails may be placed on the outside, and the other inside, against the iron rails. The locomotive-engine will then be made to pass upon the adhesive line when nearing an ascent, and by means of a long link will drag the trains which will themselves continue to progress on the iron rails. On a level ground, or nearly so, the adhesive rails may be omitted, yet if they are laid out, the same locomotive will drag heavier trains or a less locomotive will drag the same train, and there will be unity and convenience of construction for a level ground as well as for inclined planes, and the general celerity will not suffer from the addition of adhesive rails, as the locomotive-engine will have for itself a much greater swiftness than a whole train can have, and the total number of carriages, with the exception of the locomotive, will continue to progress on the iron rails. The degree of inclination which may be surmounted with the help of adhesive rails, will depend on the effort which would be necessary to make the wheel of the locomotive-engine (supposing it is locked) slide on the materials of different nature that may be employed. The descending faculty, will indeed, always be submitted to the power of the engine, but at least a footing will have been given to the wheels, whereby they will be enabled to make use of the whole of the present power, and, consequently, it will become possible to ascend planes more inclined than those which are asunder at present, without recurring either to fixed engines or extra locomotives. By this plan, moreover, the iron rails no longer supporting the locomotive-engine, but the train alone, they may be made less strong, as they will be subjected to less wear and tear, and the iron rails instead of being an inconvenience will be an advantage, and when instead of a great celerity for the conveyance of passengers, a great force is deemed expedient for the transport of goods, the wheels of the engine having firmer hold on the ground will drag much better. The chief objection to inclined planes at the present moment is, not only the difficulty of surmounting them, but also the danger of their descent. Beyond the limits of the power of the drag, there is no other check than the chain of the fixed engine, that is to say, that the lives of a multitude of persons are to be committed to the safe keeping of a chain, the very length of which offers every facility for rupture. A drag, whatever may be its power, of the description usually employed at present, can only convert the train into a series of sledges, and a sledge, if abandoned on an inclined, and at the same time, a highly polished rail, may soon acquire an uncontrollable velocity. To hold in check a locomotive force, as violent as that on rail-roads, the resistance ought not to be placed upon the moving bodies themselves, or else they must necessarily be carried away together. It is necessary then to establish on the road itself, means of resistance, which, beyond what is produced by ordinary checks, may be in proportion to the steepness of the declivities, and that resistance must not depend on the care and diligence of the conductors. The most rational means, as in every system of checking speed, are those of friction, the action of which should be proportioned to the amount of pressure that may be wished for, and multiplied by the effect of the lever, the most simple of all mechanical agents; the object in view being to moderate velocity, I have chosen the term moderator for the apparatus in question, which may be applied in a variety of ways; the following one being one of the most simple: Between the rails on each side of the axis of the road, upon horizontal supports, firmly fixed to the ground, there are to be placed two small shafts, either in wood or metal, forming, with each other, an angle, opening toward the summit of the acclivity. The upper extremities of these shafts will face the train in its descent, each turning upon an iron pivot, whilst the lower extremities will bear upon two springs, solidly fixed, and the force of which will be calculated to counterbalance the increase of velocity arising from the inclination in opposing the passage of a rubber attached to the carriage (See Plate 1). In order that the velocity may be gradually overcome, and that the action, at first easy, may go on increasing, it will be advisable to give a slight curve to the internal surface of the two shafts, so that the friction may first take place between two surfaces, nearly parallel. The rubber placed under the carriages, (see plate 2,) in penetrating into the opening formed by the upper parts of the shafts, will cause them to rotate on their own axis, and in separating their lower extremities, will press on the springs with the arm of the lever seen in plate 1; hence the suppression of all excess of velocity. The carriage having passed, the springs will cause the shafts to resume their former position, so as to afford a like resistance to the succeeding vehicles. Here, then, as means for resistance, besides the smaller frictions, are combined the action of the springs, when pressed on the action of the arm of the lever, and the friction against the surfaces of the shafts, which are iron-bound. As trains are, in general, less long than declivities, it will be less expensive, and a more regular motion will be obtained, if the springs be set under the carriage, and an uninterrupted rubber on the road, which will be a reverse of the first disposition highly advantageous (See plate 3). With this arrangement, a check-rail must be placed on the axis of the road; this rail, either of metal or of wood, covered with brass or iron, will receive two opposite pressures, produced by the springs fixed to the carriages; the thickness of the check-rail will vary, on the same declivity, according to its inclination, if the latter varies, in order that the pressure of the springs may be at all times proportioned to the inclination of the plane. This apparatus is very simple, nor does it require that moderators necessarily numerous, should be placed on the road, but, as the arm of the lever forms no part of this, multiplying as it does the action of the springs, and, as the carriages, therefore, must bear the weight, both of the springs themselves, and of their wooden or iron supports, it can only offer certain extent of resistance, without becoming too heavy, and consequently, will not suffice in any case of very long and steep declivities; in this latter instance, which will seldom occur, we shall have a carriage constructed on the same plan, on which will be concentered, by powerful springs, a quantity of resistance, as considerable as may be deemed expedient to employ, and this carriage added to the trains, will moderate their velocity, so that in the same manner as there are rails for speed, there will be a moderating rail, and there will be extra checks for steep descents, precisely as there are extra reinforcements of power for steep acclivities. This apparatus may become more economical, by substituting for the uninterrupted rail, a series of single rubbers, more or less distant from each other, and more or less broad; and in substituting also for one of the pairs of springs shewn in plate 3, two pivots, so as to present to the rubbers placed on the axis of the road an open angle, and the arm of a lever, which would be under the carriages, exactly the disposition of the figures reversed and simplified. If it should be found expedient to use a locomotive engine, the working wheels of which should act upon a central rail, an important application of this principle would be found in making a central rail, of which the upper part would be composed of adhesive materials for the ascent, whilst the side surface would serve for resistance; the steel springs are not to be employed exclusively, steam, wood, and air, will also answer the purpose. The use of the steam spring however, is attended with difficulties, whilst the wooden one might be applied to a species of moderator, something like the one described in plate 1, and the air-spring, by means of a cylinder and piston, might prove advantageous, whenever there is a great rapidity of passage. The pistons need not fit very exactly, since the air has no sufficient time to escape, and thus a force of three or four atmospheres can impart a considerable resisting power to a very simple apparatus; the excentres may also be substituted for the springs, and this with advantage in several cases. The moderators should be made more or less effective, and more or less distant from each other, according to the steepness and length of the declivity, yet, generally speaking, moderators very powerful, and at the same time very distant from each other, are not expedient. It will be advisable, on the contrary, to make them as smooth and as near each other as possible, that the effect may be uninterrupted, and without any sudden jerks or sharp reaction; and in order, that by the progress of the first carriages being stopped, the succeeding ones may not be allowed to rush against them; the first moderator should be made very weak, the next stronger, and so on progressively, so that the first carriages may not be entirely slackened in their speed, before the succeeding ones are themselves engaged with the moderators. Beyond the ordinary length of trains, the moderators should be of equal power. When a train approaches a steep declivity, it will be necessary, as at present, to slacken its speed, for when the effect of a descent requires moderating agents, it would be inconsistent to allow the full action of that very power which the moderating agents are destined to keep under controul. In the accompanying figures, the general forms of the checks in question may be observed. The dimensions must differ, according to the steepness of the hills, and the materials employed will be guided in their proceedings by the locality.

Having thus described the nature of the invention imparted to me, and which I believe to have been hitherto unpractised in this country, I would have it understood that I claim the combination of a double set of rails or bed, for the locomotive and the train, distinct from each other, whereby the wheels of the engine may have a hold or grasp on the surface on which it runs, more firm and tenacious than would be suitable for the train. I also claim the use and adaptation on rail-roads and tram-roads, (either in conjunction with or without the invention above described) of certain apparatuses for checking the speed of locomotive engines and carriages, on rail-roads and tram-roads, such as I have above described.—In witness whereof, &c.

Enrolled October 10, 1838.

Specification of the Patent granted to John Player, *the Younger, of Loughor, near Swansea, in the County of Glamorgan, Engineer, for Improvements in Furnaces and Fire-places, for Consuming Anthracite, and other Fuel for Generating Steam, Evaporation, Smelting and Heating Iron and other Metals.*—Sealed December 1, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Player, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):—

My invention relates, first, to a mode of constructing the furnaces or fire-places of steam-boilers, or apparatus for generating steam, and for evaporation, whereby they are rendered more suitable for burning anthracite coal separately, or combined with other fuel.

Secondly, my invention relates to a mode of constructing the fire-places of smiths' hearths, whereby the same are rendered suitable for burning anthracite coal.

Thirdly, my invention relates to a mode of constructing cupola furnaces for the smelting of iron-ores, and for the re-melting of iron by the aid of anthracite coal.

And lastly, my invention relates to a mode of constructing refinery furnaces for refining iron, by the aid of anthracite coal. And in order to give the best information in my power, I will proceed to describe the drawings hereunto annexed.

Description of the Drawings.

Fig. 1, is a section of a steam-boiler, or boiler suitable for generating steam, or evaporating fluids.

Fig. 2, is a plan in section, taken at the dotted line, *a, a,* in fig. 1.

Fig. 3, is another plan in section, taken at *b, b,* in fig. 1. The boiler is so constructed and arranged, as to consist of two cylindrical-rings or chambers, A, B, in figs. 1 and 3, which are connected at top by the tubes, C, in figs. 1 and 2, and at bottom by the tubes, D, in figs. 1 and 3, as is clearly shewn in the drawing. E, are the flues through which the flame and heated vapours pass to the chimney. F, F, are the fire-bars and ash-pit, which are capable of being raised or lowered by the toothed racks, G, and pinions, H. The object of this arrangement is to have the power of increasing or diminishing the size of the fire-place, and consequently the mass of fire. This arrangement will also allow of the fire-place or furnace being lowered when the fire-bars require to be cleansed or changed. In the ash-pit, F, F, it will be found advantageous to have a pan or trough for containing water; the heat radiated from the furnace will cause this water to evaporate, and the steam therefrom to pass through the fire, from which many well known advantages will be derived. I, in fig. 1, is the feeding-chamber, which is kept well supplied with fuel, and has a cover, as is shewn in the drawing, and it will be seen that the feeding-chamber passes through the boiler, consequently the anthracite coal therein will be acted on by the heat of the water, and of the steam in the boiler, which constitutes the important and novel feature of this part of my invention; for by this peculiar arrangement the anthracite coal will be found to burn with great advantage, and will not be liable to decrepitation as when thrown on to a fire in the cold state; and it will be evident that by this arrangement the anthracite coal will fall down gradually as the lower part becomes consumed, but the same cannot come below the bottom of the feeding-chamber, until in a highly heated state, and until it comes below such feeding-chamber, it does not come within the range of the draft of the atmospheric-air, passing through the fire-bars, nor within the range of the draught produced by the flues, E. I would here remark, that although I prefer to use all anthracite in this arrangement of furnace, this fuel, may however, if desired, be mixed with other fuel.

Figs. 4 and 5, shew two sections of other arrangements of steam-boilers, constructed suitably for burning anthracite coal; and in these figures the same letters indicate similar parts wherever they occur, and so far as my invention is concerned, the parts are substantially the same as at fig. 1. And I would remark that my invention does not relate to the peculiar construction of a boiler, but to the mode of applying a feeding-chamber in or through such boiler, in such manner, that the supply of anthracite coal therein, shall for the most part be out of the draft of the flues of the furnace, and consequently but little influenced by atmospheric-air, and at the same time the coal in such feeding-chamber, will be acted on and heated by the steam and hot water of the boiler; and further, any quantity of coal which may be ignited in the feeding-chamber, will give off its heat to the surrounding water. It only remains further to remark in respect to steam-boilers, or boilers for evaporation, that the feeding-chamber should be kept as full as possible of anthracite coal. And I would state that I am aware that some attempts have before been made to burn anthracite coal in furnaces, or fire-places of steam-boilers, or generators. I do not, therefore, claim the application of anthracite generally for that purpose, but only when the furnace or fire-place is arranged according to my invention, as herein described.

I will now proceed to describe the second part of my invention.

Fig. 6, shows the section, and fig. 7 a front view of a smith's hearth constructed according to my invention, and suitable for burning anthracite coal. In this arrangement there is used a feeding-chamber, I, in fig. 6, constantly supplied with anthracite coal. J, in fig. 6, is a block of fire-brick, suspended over the fire, and K, is another fire-brick in front of the fire; the object of these blocks of fire-brick, is to keep in the heat. There being a constant supply of coal in the feeding-chamber, I, it progressively becomes highly heated before it falls low enough to be influenced by the blast of air, which, under this arrangement, may be of the ordinary temperature of the atmosphere; and it will be found that by the aid of the blocks of fire-brick, J and K, and the heating of the anthracite coal in the feeding-chamber, previous to its coming within the range of action of the blast of air, anthracite coal may with facility and advantage be burned in smiths' hearths, and thus will anthracite, which is known to contain a very large proportion of carbon, and therefore more suitable than other coal for heating iron, be brought into advantageous use for smiths' hearths.

I will now describe the third part of my invention, which relates to a mode of burning anthracite coal in cupola-furnaces.

Fig. 8, is an elevation in section of a cupola-furnace.

Fig. 9, is a plan in section of the same furnace; and,

Figs. 10 and 11, shew an elevation and top view of the same furnace. The only difference from an ordinary furnace, is, in there being an enlargement, or addition, at the upper part, at, I, which in fact operates as a calciner to the furnace. L, L, are flues which carry off the greater portion of the flame and blast from the body of the furnace, M. In this arrangement the charges of anthracite iron-ore, and flux, in their proper proportions, are put in at the top of the calcining-chamber, I, and thus become gradually heated and calcined before reaching the body of the furnace, M. In a re-melting cupola, or furnace (which would be of smaller dimensions) the arrangement would be similar, the metal being substituted for the ore in the smelting-furnace. By this arrangement, anthracite coal may be more advantageously burned than heretofore.

I will now proceed to describe the fourth part of my invention.

Fig. 12, is a front view.

Fig. 13, a side view in section; and,

Fig. 14, a plan in section, of a refinery-furnace, used in the manufacture of iron; I, being a feeding-chamber, which is to be kept constantly full of anthracite coal, which will become progressively heated before it falls to the hearth. And M, is a block of fire-brick or fire-stone, moving on axes, having suitable apparatus, for raising and lowering the same; this block of fire-brick or fire-stone, is to keep in or reverberate the heat, and the anthracite, by being constantly in a highly heated state, will be usefully consumed in the refinery process, and where it will offer considerable advantages from its chemical similarity to charcoal.

Having thus described the nature of my invention, I would remark, that the principal object thereof is to bring into more general use that description of coal called anthracite, which, in ordinary furnaces, and fire-places, is liable to decripitate or fly to pieces, at the same time I do not confine myself to the use of all anthracite, as a small proportion of other fuel may be combined therewith. And I would have it understood, that although I have shewn the arrangement of furnaces or fire-places, which I prefer for the various purposes, yet the same may, in some degree, be varied, provided the principle of my invention be retained. But what I claim is, First, the mode herein described of constructing the furnaces or fire-places, with a suitable feeding-chamber for burning anthracite, and other fuel, as above described; Secondly, I claim the mode of constructing smiths' hearths, for the burning of anthracite as above described; Thirdly, I claim the mode of constructing cupola furnaces for the smelting of iron-ores, and for re-melting of iron, by the aid of anthracite, as above described; and, Fourthly, I claim the mode of constructing refinery furnaces, for the refining of iron by the aid of anthracite, as above also described.—In witness whereof, &c.

Enrolled June 1, 1839.

Specification of the Patent granted to JOSEPH ZAMBEAU, *of St. Paul's Church-yard, Chemist, for Improvements in Rotatory Engines.* — Sealed December 19, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Joseph Zambeau, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):—

The annexed sheet of drawings represents on the scale

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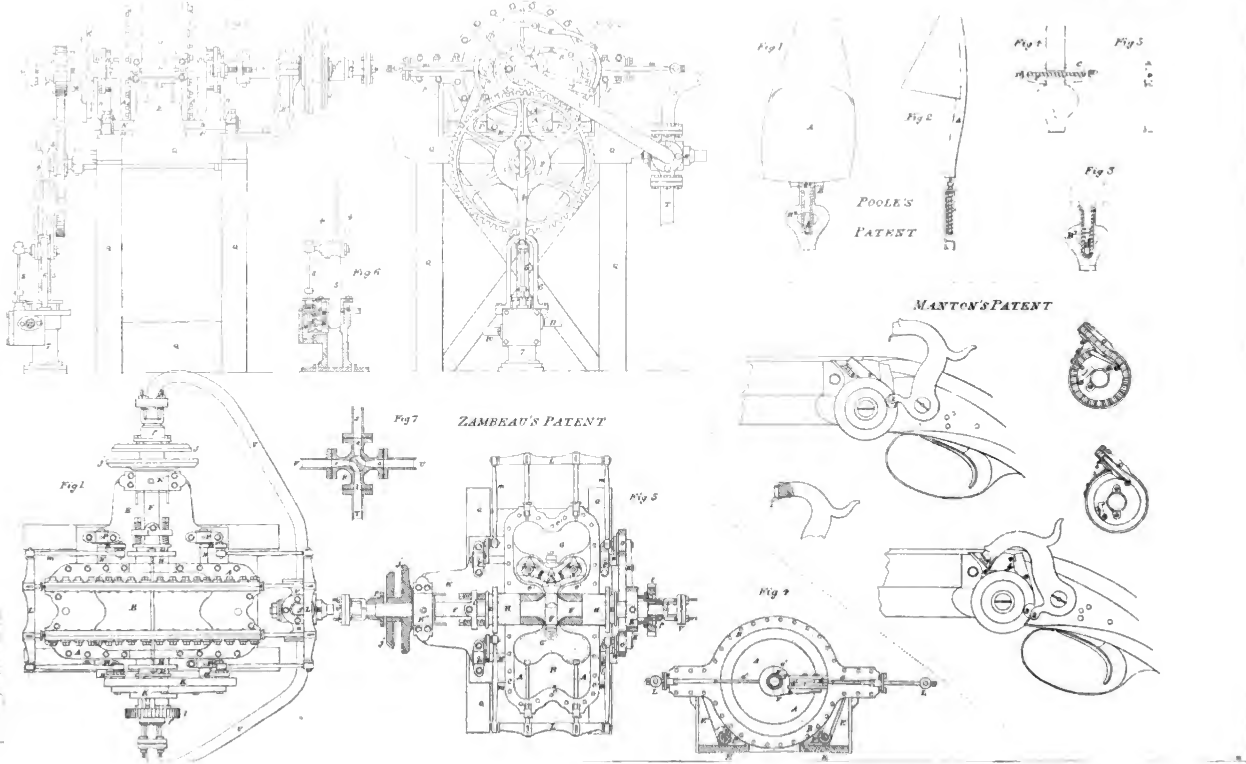


POOLE'S PATENT

MANTON'S PATENT

ZAMBEAU'S PATENT

of one sixth of the real size, various views and sections of an engine of fifteen horse power. The same letters indicate the same parts in all the drawings.

Description of the Drawings.

Fig. 1, is a plan.

Fig. 2, an elevation taken from opposite the eccentric, K.

Fig. 3, side elevation. In these three figures for a complete representation of the machine, nothing is wanted but the driving-wheel, which is fixed between the plates, J, J. The cock and pipes for distributing the steam are left out only in the fig. 3.

Fig. 4, vertical section of the engine, supposed to be opened at the joint, *a*, *a*, fig. 1.

Fig. 5, horizontal section of the same engine supposed to be laid open by the removal of the upper part of the body.

Fig. 6, vertical section of the feeding-pump.

Fig. 7, section of the four-way cock, which, according to the direction of the passages, drives the engine in one direction or in another. It will be seen hereafter that the engine may be worked at will in either direction, and is thus particularly appropriated to locomotive-carriages, to steam-boats and to mining operations. The engine represented in the drawing is set on a wooden frame, Q, Q, on which is fixed the iron frame, E, E, E, cast in one piece. This frame supports the main body of the machine by means of two uprights, E^1, E^1, on which the said main body is strongly bolted. The same frame by means of an arm, E^{11}, supports the shaft turning at one of its extremities.

The four plummers boxes, P, P, P, P, the use of which will be hereafter explained, form part of the cast-iron frame. The main body of the engine, the part which assumes an annular and concave shape, in which the piston works (which part is substituted for the cylinder used in ordinary steam-engines) is formed of six parts in bronze or cast-iron, A, A, A, A and B, B, and six stays or connecting-pieces, *c*, *c*, *c*, and c^1, c^1, c^1. The four pieces, A, A, A, A, are similar and cast on the same model, they are called the outer shells and form the two ends of the annular chamber. The two pieces, B, B, are likewise similar to one another, and cast on the same model, they are called inner shells and form the middle part of the said chamber ; all the above pieces are strongly fixed together by bolts so as to make only one annular chamber. The section of the capacity of this annular chamber which the piston must fill up completely, assumes here a shape similar to that of a heart (the shape might be wholly different, either round, square, or triangular, &c.) preference has been given to the heart-shape because it admits of the piston revolving with great speed, and procures a greater power with a less machine, as hereafter explained. The main-shaft, F, F, which revolves by the immediate action of the steam, its boss, G, and the foundation plate, *h*, of the piston, form only one single piece of wrought-iron. This shaft is bored from the extremity near the eccentric, *k*, *k*, into the boss, *g;* this passage takes then a curvilinear direction, and opens in the cylindrical surface of the said boss, and at a small distance before the piston, at u^1. The same shaft is likewise bored from the other extremity into the said boss, *g*, so as to form another passage unconnected with the first, which bends as the first, and opens on the cylindrical surface of the boss, but behind the piston at v^1, fig. 4. The piston properly speaking seen edgeways, fig. 4, and from above, fig. 5, is composed of a plate, *h*, of two series of segments and wedges driven outward by springs as in metallic pistons of ordinary steam-engines of a counterplate, *e*, screwed to the plate, *h*, having sufficient space between them to receive the metallic packing.

Each series of segments is sufficiently thick not to get engaged in a groove, cut out for the passage of the two separating plates, or steam-stops, G, G^1, between the upper and lower shells, and at the same time to close the passage of steam. H, H, hollow plugs, for compressing tow or other packing between each of them, and the boss, *g*, that the centre of the machine be perfectly air-tight, and that no steam may escape. Screws which pass in the flanges of these plugs, and screw on each side into the nave of the outer shell; tighten the packing as much as necessary. These plugs are conically hollowed out. I, I^1, cones fitting in the conical cavity of the plugs, H, H, wherein they must revolve. These cones may move along the shaft, but are obliged to revolve with it, because the bush, *i*, and the boss, K^1, of the eccentric, K, which are both fixed in the said shaft, carry two screws, the ends of which penetrate in the basis of the cones, and near the edges of the same. By this contrivance, it is always possible to correct any excess of play, which might be caused either by wearing, or by too great a pressure being exerted on the tow-packing. The driving-shaft, F, F, is maintained in the centre of the machine by the cones, and also by the arm, E^1, before mentioned. This arm maintains the shaft in a central position, near the driving-wheel, that the said shaft may resist the effort made by the said wheel, to transmit the power. J, J, discs, one of which is fixed to the driving-shaft, F, F; the other is stationary. It is between these discs that the driving-wheel is fixed. The size of this wheel may vary according to the speed required. In engines of very small power, a pulley may be substituted for the driving-wheel; in which case the power is transmitted by a band, instead of geering. G, G^1, separating-plates, or steam-stops, which, in the operation of the machine, perform a most important part, by closing steam-tight the annular chamber, and presenting thus a bearing point to the steam, which always enters by the centre of the shaft, between one of these separating plates and the piston, while the other separating-plate rises out of the way of the piston, and leaves it a free passage. These separating-plates are somewhat wider than the piston, in order to bear, by their outer edge, against the groove in the chamber, and close all passage to the steam on the side to be occasionally in contact with the boss of the shaft, F, F; these separating plates carry a metallic blade, constantly pushed by a spring against the said boss, so that as may be seen in figure 5, all communication is cut off between the atmosphere and the steam coming from the boiler, while the said steam produces its dynamic effect on the piston. To each of these separators are fixed two parallel rods, projecting out of the engine, and passing through stuffing-boxes. These rods are fixed on the cross bars, L, L, which, by means of the beams, *m*, *m*, and m^1, m^1, of the arms, *n*, *n*, and n^1, n^1, fixed on the shafts, N, N^1, revolving in the plummer boxes, P, P, and P^1, P^1, receive the proper motion, and drive the separating-plates as aforesaid. The eccentric, K, K, is formed of a cross, fixed to the driving-shaft, and two ellipses concentric of a peculiar shape, and fixed on the said cross. Nearly one half of these ellipses is of a circular form, and is placed concentric in the driving-shaft, while the remainder of the ellipses is oval, and sufficiently eccentric, to transmit the necessary motion to the separating-plates, so that the piston may, while revolving, pass over each of them, without touching the same. These ellipses retaining the rollers, *o*, *o*, enclosed in the interval which separates them, force the said rollers and the separating-plates to move to and fro alternately, when the shaft and the piston revolve. The form of the eccentric causes the separating-plates to remain alternately closed more than half the time, that is to say, that one of them begins to be open only when the other is completely closed, and is afterwards closed before the other begins to open. By this combination the steam never ceases to have a stop, and the impulse given to the shaft, by the pressure of the steam on the piston, is perfectly equal in every portion of the revolution. The apertures, u^1, and v^1, on the boss, *g*, of the driving-shaft, F, F, by which the steam enters the chamber, and runs out of it, are placed as represented, fig. 4, by dotted lines; first, that one of the separators be always interposed between the induction and the eduction orifice, so as to hinder the steam admitted from escaping, without having produced its dynamic action.

Secondly, that the separators, when moving, be not pressed by steam more on one side than on the other. The pressure of steam is exerted only on one of their sides, when they are closed, and that pressure has ceased before they respectively begin to open; consequently, they are set in motion with the greatest ease, and oppose no resistance beyond that of their own weight. This absolute liberty in the motion of the separating-plates, even when the pressure of the steam working the machine is at its greatest height, is very important in two respects. Firstly, because it has the facility of giving great lightness to all the pieces necessary to set alternately in motion and at rest the separating-valves; and in consequence of the lightness of the machinery, the engine may be worked more rapidly, wherefore a smaller engine will be sufficient to procure a given power.

Secondly, as the said pieces are the only ones which receive an alternate motion, and are of little weight, and experience very little friction; they are placed in the best possible conditions to ensure the durability of the engine, and its good operation, even though the engine should be jolted on a locomotive carriage, set in motion on a rutty road. U, V, pipes for the admission and eduction of steam. These pipes are introduced in the two ends of the driving-shaft, and adapted to a four-way cock, R, by the agency of which the induction aperture is changed into an eduction orifice, and reciprocally, merely by turning the plug one quarter of a revolution. The stuffing-boxes, *f*, *f*, fixed by means of screws, one to the disc, J, and the other to the eccentric, K, allow the shaft to revolve on the end of the fixed conducting pipes, U, and V, without any escape of steam.

These conducting-pipes are subjected to a pressure, which tends to drive them out of the shaft on which they are introduced, but these are maintained by means of the pieces, *r*, *r*¹, consisting each of a ring and two rods, with a screw cut on their extremity; these rods pass through holes pierced in the flanges of the conducting-pipes, and are there secured by bolts. The rings have a shoulder, which is fixed in the interior of the stuffing-boxes, *f*, *f*, the ring of which is fixed outside the rings of the pieces, *f*, *f*; the said pipes cannot be driven back, and are maintained in their place, notwithstanding the pressure of steam. The cock, R, has four ways, *s*, *t*, *u*, and *v*, represented in section, fig. 7; in the plug of the said cock are cut two curved passages, this cock serving, as before stated, to change the ingress and egress of the steam, serves also to make the engine revolve in one direction or the other at will.

Let us suppose, *s*, the passage, through which the steam comes from the generator, according to the position of the plug of the cock; the said steam will pass either by the channel, *u*, or by that marked *v*, and enter the engine through the pipes, U or V. If the steam arrives by the pipe, U, it enters the machine by the orifice, u^1, in the boss, and pressing against the separating-plate, G, which is closed, and the piston, it will drive the latter in the direction indicated by the arrow, fig. 4. As the piston proceeds, the plate, G, gradually closes itself, and reaches the end of its course, when the opening, u^1, is arrived opposite to it; the said plate is then quite closed, and the steam being in contact with both sides of the said plate, pressed equally fore and aft. Till then, the steam bears always on the other plate, which remains shut, until the aperture, u^1, has passed the plate, G, which has just been closed. As soon as that aperture, which revolves with the shaft, has got beyond the plate, G, this one begins in its turn to serve as a bearing for the steam; soon after the aperture, *v*[1], arrives opposite to the plate, G[1], the steam, which has produced its dynamic effect, and which occupies then the part of the chamber not occupied by the piston, escapes by the aperture, *v*[1]; the equilibrium of pressure is established on both sides of this plate, which begins to recede, in order to give passage to the piston. What has been stated with reference to the plate, G, takes place then for the plate, G[1], and so on. Thus results a constant pressure of steam on the piston, which continues to rotate in the direction of the arrow. The same effect is produced, as long as the steam enters in the chamber, by the aperture, *u*[1], and issues out by that marked *v*. It must here be stated, that when issuing by the aperture, *v*[1], the steam is conducted to the crank, R, by the pipe, V, which is in communication with the passage, *t*, from whence the said steam is either conducted into a condenser, allowed to escape in the atmosphere, or led into a larger engine, where it is to act by expansion, according as the steam is condensed, allowed to escape, or used by expansion in another engine; but if the plug of the cock, R, be turned one quarter of a revolution, the pipe, S, which was the induction-pipe, is then in communication with the pipe, V, and the exit-pipe, T, is in communication with the pipe, U. The steam enters in the chamber, by the aperture, *v*[1], of the boss on the shaft, and issues by the aperture, *u*[1], on the same boss. Thus the piston receives on its opposite side the action of the steam, and revolves in a direction contrary to the one indicated by the arrow. In this direction, as in the first, the separating plates act with full liberty. The engine just described, may revolve at a speeed of eighty to one hundred revolutions per minute, and produce from thirteen to sixteen horse-power, when worked with steam at the pressure of sixty pounds on the square inch. On account of its small compass, and light weight, of the facility and rapidity of changing the direction of the rotation of the uniformity of its power, at all the points of the circle traced by the piston, of the rapidity and ease of its action, of its solidity in all its parts, which are not likely to get worn or out of order; this engine is particularly appropriated to locomotive carriages, on rail or other roads; it will require less steam, and wear better, than the engines actually in use, which, as it is well known, consume a great quantity of steam, and get very soon out of order. These frequent repairs are rendered necessary, by the excessive speed at which they are worked, and which is not warranted by the principle of their construction, as by that principle they are obliged to set in motion heavy machinery, and as this cannot be done, without causing, on the various pieces, a strain, which increases necessarily as the square of the speed, and becomes soon so very great that the pieces cannot stand long, however carefully made, and though of the best materials. This direct rotatory engine is free from all these objections, as it gives an alternate motion only to the separators, G, G^1, which are very light. Moreover, a locomotive carriage requires two engines with cylinders, while one rotatory engine would suffice. Experiments have proved that this rotatory engine produces more available power from the best engines, on the ordinary system, as it has been found to reach nine-tenths of the total power created. This advantage operates a saving of fuel, and equals the saving obtained by the expansion principle. I consider that the expanding of steam ought not to be used in locomotive engines, and that it is preferable in every respect, for that object, to have a power of a uniform magnitude at every point of the piston's revolution; but in all the other applications of this engine, recourse might be had to the expansion principle, either by applying a contrivance for stopping the ingress of steam, during part of the piston's revolution, or by using two engines, one of which should be provided with a chamber, double in capacity to that of the other. To this effect the two engines should be set on the same shaft, so as to make each of them an equal number of revolutions. The steam from the generator is to be introduced in the small engine, and when issuing from it, to be conducted into the larger one; by this means the steam will act by expansion, and thereby increase the available power produced. The feeding-pump of this engine represented at figs. 2, 3, and 6, is peculiarly constructed, having no valves, either flat or spherical, as in the ordinary feed-pumps, but provided with a sliding valve, or register, similar to those used for distributing the steam in ordinary steam engines. This sliding valve opens and closes the passage of the liquid, by changing its own position at the end of every course of the piston. This contrivance removes all the objections justly made to the feeding-pumps of steam-engines. The feeding-pump is represented in front and side views, and in section, figs. 2, 3, and 6, of which the following is a description. The pinion, 1, fixed on the driving-shaft of the engine, takes into the wheel, 2, which by means of the trunnion, 3, fixed towards the centre, and forming a crank, moves the piston of this pump by the agency of the shaft, 4. 6, guide directing and supporting the piston, the rod of which slides through the eye of the said guide, and is thus maintained in the direction of the cylinder, 7. The bolt which joins the shaft with the piston-rod, projects beyond the same, and on this projection carries a ring, in which is introduced the rod, 8, of the slide valve, 9. This rod is provided with two stops or plugs, to cause the slide-valve to rise slightly, when the piston is at the top of its stroke, and to descend in a like manner when the piston is at the bottom of its course. The body or cylinder of the pump has three apertures; the lower one corresponds with the interior of the cylinder; the middle aperture corresponds with the water-tank, by means of the suction-pipe, 10; the upper aperture corresponds with the boiler, by means of the pipe, 11. By this contrivance, when the piston is at the top of its course, it raises the slide-valve, and this valve covers then only the suction aperture, and the water, being pressed by the descent of the piston, is driven through the pipe, 11, into the boiler, with which the body of the pump is in communication. When the piston arrives at the bottom of its stroke, the slide-valve descends, covers the two lower apertures, and establishes a communication during the subsequent ascent of the piston, between the interior of the pumps, cylinder, and the suction-pipe, 10. The cylinder of the pump gets then filled with water, and the piston having reached the top of its stroke, causes the register to rise again, and brings it in a suitable position to allow of the water being driven into the boiler, and so on.

The advantages of this new feeding-pump are very striking; its action can in no case be stopped, even though extraneous substances be drawn into it along with the water, because, instead of remaining open as the rising valves, flat or spherical, when an extraneous body presents itself, the sliding-valve or register cuts it or crushes it, and the functions of the pump proceed without any stop or hindrance.

The importance of this improvement will become manifest, when it is considered that in most cases, the explosion of steam-boilers takes place, because the water they contain has been allowed to drop below its proper level; this circumstance is always attributable to the defects of the feeding-pumps employed, which defects have not been cured hitherto, notwithstanding all the attempts made for that purpose.

Having thus described the nature of the invention, and the manner of performing the same, I would have it understood, that I lay no claim to any of the parts separately. But what I claim is, the mode of constructing the steam-cylinder or chamber and piston, and mode of working the slides by eccentric and parts connected therewith, as described.—In witness whereof, &c.

Enrolled June 19, 1839.

Specification of the Patent granted to Moses Poole, *of the Patent Office, Lincoln's Inn, in the County of Middlesex, Esquire, for certain Improvements in Clogs.* —Sealed January 11, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Moses Poole, do hereby declare the nature of the said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

The invention relates to a mode of constructing clogs, whereby only a portion of the under part of the shoe or boot (the sole and heel) is covered by the sole of the clog, in place of having the sole of the clog to proceed from end to end of the foot, as has been the case heretofore.

Description of the Drawing.

Fig. 1, is a plan ; and,

Fig. 2, a side view of a clog for the left foot, constructed according to the invention.

Fig. 3, shews an underside view of the elastic coupling which connects the side of the clog with the sole of the shoe or boot with which it is worn. The clog, so far as the sole and fore-part, or shield go, is similar to the ordinary construction of clogs, excepting as to the length of the sole. A, is the sole, having attached thereto the elastic coupling, B, which consists of the bent rod or wire, B^1, which is hinged to the sole, A, as is shewn in the drawing. B^2, is a plate of brass, or other suitable metal or material, having a slot or opening, at B^3, the object of such opening being to attach it to the sole of a boot or shoe, there being a screw or other suitable attachment in the sole of the same. The plate, B, is bent over in order partly to cover the wire, B^1, around which a spiral spring is wound, as there are holes through which the wire, B^1, passes; when the plate is drawn back and held by the screw, the spring will be condensed, as shewn by dotted lines, and cause the sole of the clog to be securely held to the sole of the boot or shoe, notwithstanding the movement produced in the act of walking.

Figs. 4 and 5, shew two views of another elastic attachment. In this case the connection of the plate, B, and the sole of the clog, is by means of a strap of leather or other suitable material, C, through which the rod, D, passes, on which is wound a spiral spring, which is condensed when the plate, B, is drawn back, in order to attach it to the sole of a boot or shoe, as is shewn by dotted lines.

Having thus described the nature of the invention, I would remark, that although I have only shewn two arrangements of means to attach the sole of the clog to the sole of a boot or shoe with which it is worn; yet it will be evident that these means may be varied, so long as the connection allows of such play or movement as is required to retain the sole of the clog to the sole of the boot or shoe with which it is worn, in such manner as to allow of the necessary freedom or elasticity and bending of the sole of the clog, and of the boot or shoe in the act of walking. I do not, therefore, confine myself to the use of the connecting means shown. But what I claim is, the mode of constructing clogs as herein described.—In witness whereof, &c.

Enrolled July 11, 1839.

Specification of the Patent granted to GEORGE HENRY MANTON, *of Half Moon Street, Picadilly, in the County of Middlesex, Gun Maker, for certain Improvements on Fowling Pieces, and other Fire-Arms.* —Sealed February 11, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said George Henry Manton, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures marked thereon (that is to say) :—

My improvements consist in the mode of constructing and applying a circular magazine, containing a series of copper caps, one of which is constantly kept at the point of the neck, by a spring, as is well understood, to the lock of a fowling-piece or pistol (single or double), which lock is so constructed, that in bringing it to the full cock, the cap discharged is removed, and its place supplied by another, which movements are effected by a spring, (1), at the back of that part of the cock which inflames the cap, having a projection which removes the cap above named, as shewn by the drawing annexed, and the other cap is placed on the nipple, by a projection, (2), on the lower part of the cock, acting in a hollow, (3), cut in the top or cover of the magazine, as also shewn in the drawing, so that the party using the same may have no trouble in effecting an exchange of the cap thus discharged, until those contained in the magazine are all consumed.

Description of the Drawing.

The cap to be next supplied to the nipple is kept in its place, and protected from wet in the short neck of the magazine by a slide, 4, pressed outward by a spring, 5, and the slide, 4, is removed out of the way by the spring, 5, coming against a projection, 6, at the back of the breech.—In witness whereof, &c.

Enrolled August 11, 1839.

Specification of the Patent granted to JAMES NEVILLE, *of Clap Hall, near Gravesend, in the County of Kent, Civil Engineer, for a certain Apparatus or Furnace for Economizing Fuel, and for more effectually consuming Smoke or Gasses arising therefrom, the same being applicable for the generation of Steam, and for Heating or Evaporating Fluids.*—Sealed August 31, 1837.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said James Neville, do hereby declare the nature of the said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

According to the most usual construction of furnaces applied to steam-boilers, and to other vessels for generating steam, and for heating and evaporating fluids, the fire-bars are solid, and the fuel is placed on them, the gases and smoke evolved rise above the fuel, and passes away to the flue and chimney. There have however been attempts in some arrangements of furnaces to produce a downward draft through the fire-bars, in order to cause the vapours distilled from the fresh fuel (which from time to time would be laid on to the ignited fuel on the fire-bars) to pass through the ignited fuel on the bars, but such arrangement of furnace has not proved successful, owing to the destruction of the fire-bars. And further, there have been furnaces constructed with an upward draft, with the hollow fire-bars. Now the object of the present invention is to construct furnaces of steam-boilers, and generators, and vessels for heating and evaporating fluids, by combining the downward draft with hollow fire-bars, such hollow fire-bars being in connection with the boiler or vessel to which the furnace is applied, in order that the fluid to be operated on may circulate freely in the fire-bars, and take heat therefrom. By this means in addition to the advantages of preserving the fire-bars, the smoke and gasses evolved from the fresh fuel laid on to the fire, will, in consequence of passing downwards by the downward draft between the fire-bars, come in contact with, and be subjected to the ignited fuel on the fire-bars, and by such means be consumed. It will be evident to the practical engineer, that as there are varied arrangements and construction of vessels for generating steam, and for heating and evaporating fluids, there will be a necessity for varying the arrangement of furnace with hollow fire-bars, with downward draft, according to circumstances, which, however, the practical engineer will readily arrange when he has examined this, my specification, and the drawing hereunto annexed, which represents my invention applied to one arrangement of steam-boiler or vessel for evaporating fluids.

Description of the Drawing.

In each of the figures of the drawing, the same letters indicate similar parts, *a, a,* being a series of hollow bars, which are so arranged, that the fluid in the boiler or vessel, *b, b,* can circulate freely through the bars, *a, a,* as will readily be understood on examining the drawing. *c, c,* is an arch of fire-brick, which I prefer should be constructed over the fire-bars, which becoming highly heated, will materially facilitate the combustion of any gases or vapours which may be evolved into the furnace above the fire-bars. Atmospheric air is to be supplied by any suitable blowing apparatus, or a draft may be produced by the chimney, as is well understood, so as to supply the furnace with a constant flow of air above the fuel on the fire-bars, and the same will pass down through the fire, and between the fire-bars. The other parts of the drawing being clearly shewn, will readily be understood, and will require no further description.—In witness whereof, &c.

Enrolled February 28, 1838.

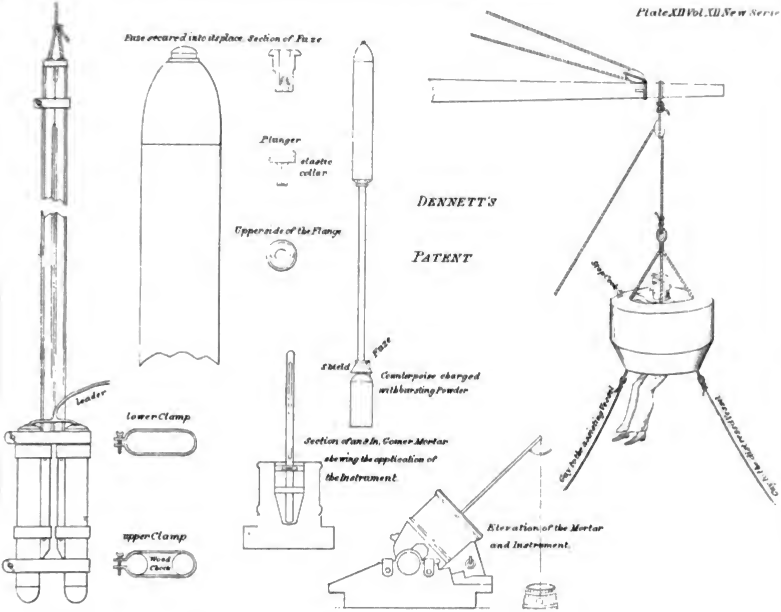
Specification of the Patent granted to JOHN DENNETT, *of New Village, in the Isle of Wight, in the County of Hants, Engineer and Surveyor, for Improvements in War Rockets, and in the Methods and Apparatus for applying the Powers of Rockets for the Purpose of obtaining Communication with Vessels which are stranded or in other Situations of Danger, also an Improved Instrument and Method for accurately Pointing Mortars for Throwing Shells, which may likewise be used for Firing Shot from Mortars, for the Purpose of obtaining Communication with Ships.*—Sealed August 2, 1838.

WITH AN ENGRAVING.

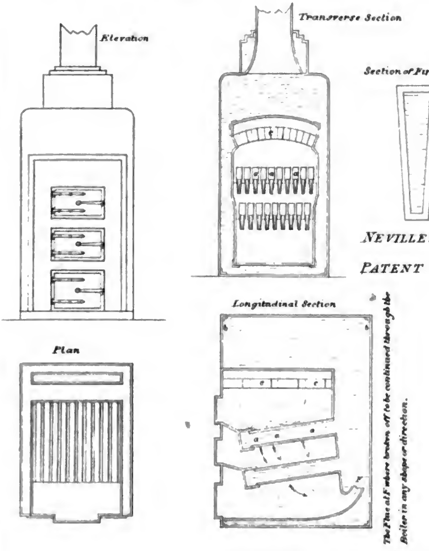
To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said John Dennett, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following description thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

Rockets, as they are now manufactured, for military purposes, are generally constructed to burst their shells at

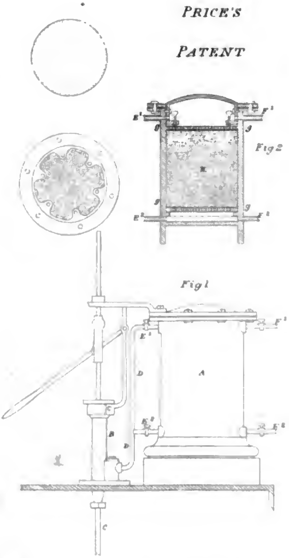
DENNETT'S PATENT


Fuse secured into its place
Section of Fuze
Plunger
elastic collar
Upper side of the Flange
Fuze
Shield
Counterpoise charged with bursting Powder
leader
lower Clamp
upper Clamp
Wood Cleats
Section of an 8 In. Comer Mortar shewing the application of the Instrument
Elevation of the Mortar and Instrument
Stop-cord
Guy to the assisting Vessel
Guy to the distressed Vessel

NEVILLE'S PATENT


Elevation
Transverse Section
Section of Fire Bar
Plan
Longitudinal Section
c
c
c
a
a
F
The Flue at F where broken off to be continued through the Boiler in any shape or direction.

PRICE'S PATENT



LONDON Hodson 112 Fleet Street October 1.1839

THE UNIVERSITY OF CALIFORNIA

given distances, as nine hundred, one thousand two hundred, or one thousand five hundred yards, &c., according to the calibre, and they cannot be altered in the field to adapt them to any other ranges. Therefore, if a rocket constructed to explode at one thousand two hundred yards, be fired at a body of men, or other object, posted at one thousand four hundred yards distance, the shell will explode before it reaches them, and consequently render such fire useless, or if the object be at a less distance than one thousand two hundred yards, say one thousand yards, it is obvious that the rocket would pass beyond before the shell bursts, and the effect of the explosion be equally lost.

Description of the Drawing.

The object of my first improvement is to render rockets of any calibre more effective, by causing their united powers of penetration and explosion to be made available at all distances within their extreme range, by bursting their shells at the moment of impact on any object against which they may be fired. And this I accomplish by means of percussion fuzes of a peculiar construction, which are screwed into the fuze-holes tapped to receive them at the apex of the shells. These fuzes are made of copper, gun-metal or other fit material, and have a shoulder, on which is cut a male-screw to fit the fuze-holes, and a flange or run above it, on which it screws down firmly upon the shell. The body or shank is bored down to within about a quarter of an inch of the end, and this bottom or solid part is perforated with a smaller hole, into which is screwed a projecting piece or nipple, which receives a percussion-cap, nearly similar to those used for fowling-pieces. A plunger of iron, hard gun-metal, or other fit material, is accurately fitted into the bore, and of sufficient length to reach below the top of the cap; its upper end is made with a broad strong head, underneath this head is fitted a collar of cloth, felt, or other elastic substance of sufficient thickness to prevent the plunger from touching the cap when it is put into the fuze, which should not be done till the rocket is prepared for firing. This collar is to prevent the plunger from being pushed with violence down upon the cap, and secures it against the danger of accidental explosion, but from the elastic nature of the materials, it will not prevent it from being driven down and exploding the cap when it strikes an object against which it is fired. The several parts may be understood by reference to the drawing No. 1.

I construct some rockets in a different manner. Instead of a nipple and cap; I make the bottom of the bore convex, and perforate it with one or more holes. In the bottom of the plunger is made a shallow cavity, which is primed with the detonating composition, which explodes on being driven down upon the convex bottom. In either case, a small flat must be made on one side of the plunger, to allow the air to escape when it is pushed into the fuze. As another variation, I construct some without a plunger. These are made with a strong neck or nipple, projecting above the flange on the outside of the shell, and on which a percussion-cap of larger dimensions is fixed. The parts below the cap are primed and perforated in the same manner as a priming tube for a piece of ordnance.

My next improvement is intended to increase the destructiveeffects of rockets, and to dispense with the pole or stick, which is at present always attached to them. Instead of the pole, I substitute a short iron-bar or rod, either solid or tubular, which screws into the centre of the rocket in the same manner as does the socket of the pole. To the other end of this bar or tube I attach a counterpoise of metal or other substance, of such form and weight as circumstances require. Some I make hollow of wrought or cast iron, of cylindrical or other forms, and these I charge with gun-powder, carcass-composition, case-shot, or combinations of them, or of other combustible or explosive materials, which powder or compositions are to be fired by fuzes, which ignite by the fire from the vent of the rocket, and may be calculated to burn till after the rocket itself is expended. By such means, in addition to the ordinary powers of penetration, explosion, &c., which rockets possess, I obtain a subsequent power of explosion and conflagration.

To prevent the counterpoises from becoming heated by the fire from the rocket, and thereby endangering the ignition of the powder, &c. within them, I place a conical guard or shield of iron, a small distance above them, which prevents the fire of the rocket from infringing upon them. Through this guard or shield, the head of the fuze must project, which being primed and quickmatched in the usual manner, will insure its ignition when the rocket is fired. I sometimes also fix in the outside of the rocket case, certain ribs or projections of metal in a spiral direction, so as to cause it to rotate on its axis during the time of its flight, which tends in certain circumstances to preserve a greater accuracy in its direction. For case-shot counterpoises, the case may be cylindrical, of strong sheet-iron, with the lower end, or that farthest from the rocket, left open. In the upper end, or in a small chamber within it, I place a charge of powder, and over that a good strong wad of felt, leather, wood, or other fit substance, which must be closely fitted round the edge. On this I place in layers, as many musket or pistol balls, or buck-shot (according to the size of the rocket) as will nearly fill it, putting sawdust between the layers, so as to fill the interstices between them. I then close the cylinder with a good plug of wood driven down close upon the balls, or I place in the larger case several small cylinders, each loaded with powder, and one or more balls, the whole of which will be fired by a small portion of powder communicating with the fuze and their respective vents. It is obvious that such rockets fired amongst bodies of men or horses, must create great destruction and confusion, for after the rocket has produced its effect, and bursted the shell on its head, a volley of balls will be fired amongst them from the other end in whatever direction it may point. These counterpoises screw on, so that either kind (ready charged) may be attached to the rocket during an action, to suit the circumstances of the required service.

The arrangement of the several parts may be understood by reference to the drawing, No. 2.

My next object relates to improvements for the extension of my system of applying the power of rockets for saving lives from shipwreck, by enabling the crew of a vessel at sea to take out the crew of another which is waterlogged, or otherwise in danger of foundering, in which state they are so frequently fallen in with, and from the great difficulty, and some times impossibility of relieving them by the means at present resorted to, they are too often necessarily abandoned to their fate, and the people left to perish after the most dreadful and protracted sufferings. The object of rescuing my fellow-creatures from this most horrible of all descriptions of wreck, to which the seaman in his innumerable dangers is exposed (though its appalling circumstances, which often place him beyond the reach of human aid, are not witnessed by the eye of benevolence on shore, and consequently are not so generally understood and provided against as those which happen upon our coast), I endeavour to accomplish as follows: The vessel intending to render the assistance having taken the most eligible position to leeward of the wreck, and obtained a communication by means of a rocket and apparatus which I have previously invented, and which are well known, for the use of ships; she then by means of the rocket line, sends on board self-inflating life-slings, which I have invented for the purpose, to which is previously bent a rope, running through a tail-block, lashed to the yard-arm and through a leading-block near the deck. A guy is also bent to the one of the thimbles at the lower part, and when hauled on board the wreck, another guy is bent to it, instead of the rocket-line. It is then ready to be alternately hauled from one vessel to the other. Into these slings, a man places himself, sitting astride the seat which crosses them, and then on giving a signal with his hand, comes overboard, when he will be immediately hoisted on board the other vessel by the whip-fall at the yard-arm. When in the slings he is perfectly secure, for he can neither sink nor be washed out of them, and is quite protected from injury should he chance to swing against the side or rigging whilst being hoisted in. These self-inflating life-slings are constructed in the following manner. I take three strong hoops, like mast-hoops, large enough for a stout man to pass easily through them ; across one of these I fix a narrow board, which forms a seat, the upper side of which I pad with cork shavings and canvass, I then connect them firmly together with white rope, the ends of which are spliced together to form double-slings, which cross underneath the seat, and to the four parts of the rope ; the hoops are then securely seized at the necessary distance apart. In the two bights of the rope above the hoops is seized a large brass-thimble, to which the whip-fall bends for hoisting. Two other thimbles are also fixed by straps on the opposite sides of the lower hoop, to which the guys are to be bent when in use. On the outside of the frame of hoops is securely fixed an air-vessel, composed of canvass or other material, rendered perfectly air and water tight, by a solution of caoutchouc or other fit waterproof composition. It may be made of various forms, but perhaps the most eligible is that of a short cylinder, terminating at bottom by a truncated cone ; two or three narrow hoops are securely fixed inside of the outer coat of the cylindrical part, to keep its circumference extended. In the upper end of this cylinder is fixed a short stop-cock of largish bore, the plug of which may screw in, or turn, in the ordinary manner. It is evident that when not in use, the machine may be compressed, so as to bring the hoops close together, and it will then be nearly flat, and will occupy but very little room. Now, supposing it to be in this condition, with the stop-cock open, if we gradually extend it to its full dimensions by pulling at the opposite ends, the pressure of the atmosphere will cause the air to rush in through the opening of the cock, until it completely fills the space within, the stop-cock being then turned will securely retain it. By this simple operation it becomes self-inflated, and capable of floating a very considerable weight. But, in case it be desirable to obtain a higher degree of inflation, I attach a small force-pump, or injector, which is a small cylinder, formed of the same material as the air-vessel itself; the circumference of this cylinder or pump, is kept extended by a spiral-wire, or series of small hoops, whilst it is capable of being compressed and extended in the direction of its length. The top and bottom of this cylinder are formed of wood or other fit material, in each of which is an air-tight valve, opening inwards, and closed by a slight spring, and across the top is attached a handle. By briskly working this cylinder, or in other words extending and contracting it in the direction of its length, more air may be forced in.

These self-inflating life-slings may also be used with great advantage for conveying the people to the shore from a stranded ship, when suspended to a block, traversing on an hawser, for which purpose they will be infinitely more safe and convenient than a cot, or other apparatus at present in use.

They may also be used with equal advantage in rescuing the people from a vessel wrecked at the foot of a perpendicular cliff, as Portland, Freshwater, &c., when attached to a cliff-gin which I have contrived for that purpose. This is represented in the drawing, No. 3.

My next improvement is to enable persons in either of the cases above mentioned, to use a combination of rocket power, by which means the line may be carried out to a much greater distance than usual, or a much larger line be conveyed if circumstance require it, and this without making any change or alterations in the apparatus previously supplied, which I consider an object of great importance, as ships and stations already equipped, can immediately avail themselves of the advantages which it offers at a very trivial expense. This I accomplish by connecting the rockets together, by means of shackles, or clamps of iron, which go on over the rockets and secure with screws. One of these fixes round the rockets at the lower ends, close to the vents, and another immediately above the upper ends of the poles. In the upper one is fixed a wood-chock or saddle, with semi-circular ends, which form a seat for that part of the rockets, and supports them firmly at the distance required, by the intervention of the poles. This chock is fixed to the iron clamp only at one side, which leaves the clamp at liberty to spring open when the screw is slackened, which renders it easily to be slipped on or off over the ends of the rockets. One or more clamps of a smaller size are slipped on over the poles, and screwed fast to keep them together in a proper position. In order that the two rockets may ignite at the same instant by the priming of the lock of the rocket-frame, I connect their vents by a leader composed of several strands of cotton or worsted quick-match, which leader is covered with a tube of cloth rendered waterproof by a solution of caoutchouc or other composition. Each end of this leader is fixed to a cross of copper or brass, two arms of which are bent at right angles, so as to enter the vent of the rocket into which they are pushed, and by their elasticity they expand and retain the leader in its position. The other two arms reach across the vent and form stops, to prevent it being pushed into the rocket too far. The ends of the leader go through the centres of these spring-crosses, and project about an inch into the vents of the rockets. To the centre of this leader is attached another limb of the same description, long enough to reach into the pan of the lock; this end being well primed, will ignite by the sparks and convey the fire simultaneously to both rockets. These arrangements are explained in drawing, No. 4.

My next is an invention of an instrument for accurately pointing mortars, by a line correctly coincident with the axis of the bore, instead of lines temporarily chalked upon the outside of the mortar, as is now practised, by which the errors arising from any difference in the thickness of metal, or in other words, want of concentricity between the axes of the interior and exterior surfaces of the metal, will be obviated. This instrument may be made of brass or other metal, or partly of wood and metal. It consists of a stem or main-piece, which must be two or three feet longer than the mortar, and worked perfectly true, with its sides parallel to each other, and of equal thickness, which must be sufficient to prevent any tendency to bend by its own weight. On the upper surface of this piece a middle line is correctly marked through its whole length. An opening is cut through this piece from the upper end, about two thirds its length, and in this opening is strained a silk cord or fine wire, correctly coinciding with the middle line above mentioned. Across the upper surface of this piece are fitted two other pieces, correctly at right angles with it, and their centres exactly coinciding with the middle line, their length being about one eighth of an inch less than the diameter of the bore of the mortar with which it is to be used. These pieces slide up and down on the stem, to adjust the distance between them to the length of the bore, and they screw fast by the milled heads on the under side. To the upper one is attached a spirit-level, by which it may be placed level. On the lower one, or on the end of the stem, is fixed a weight, sufficient to prevent the other end from preponderating when it is placed in the mortar. If the instrument be placed in the bore of the mortar, with its upper surface level across, or in the direction of the trunions of the mortar, the cross pieces resting on the surface of the bore, and the long arm with the opening in it projecting beyond the face of the piece, the wire or cord in it will accurately correspond with the axis of the bore and form a prolongation of it in that direction, whatever be the form or imperfections of the outside. Things being thus arranged if two pickets be driven into the ground in the direction of the object to be fired at, and a fine line strained between them, passing over the mortar (in the manner practised in the French service), and the mortar traversed till the wire in the instrument coincides with this line, the bore of the mortar will be correctly pointed for the object. On the underside of the outer end of the long arm or stem, is fixed a small quadrant or semi-circle, accurately graduated with a small spirit-level, turning on its centre, and carrying an arm or index, by which the elevation of the bore is determined. Instead of a spirit-level, a silk cord may be suspended from the centre, with a plummet at the lower end; the silk will then cut the angle of elevation. The plummet and part of the cord should be immersed in a vessel of water or other fluid, to prevent its vibrating by the action of the wind. When the plummet is used, if the mortar is traversed till the wire in the stem, the pendulum and the object be seen in the same plane, the pointing is correct. In this case the line and pickets will not be necessary, but may all be used together if preferred. This is explained by the drawing, No. 5.

Having thus described the nature of my invention, I would remark that I lay no claim to any of the parts which may have been before known and in use, and variations may be made in some of the parts so long as the principles of my invention be retained, and which I have fully explained in this my specification.—In witness whereof, &c.

Enrolled February 2, 1839.

Specification of the Patent granted to George Price, *of Cornhill, in the City of London, Esquire, for Improvements in Clarifying Water and other Liquids.*—Sealed June 14, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said George Price, do hereby declare the nature of the said invention to consist,

First, in the application of what I call a double branch rising main force-pump to a filtering-apparatus, in such manner that it will feed the filter either for filtration by ascension, or for filtration by descension, and force the liquid required to be clarified in either case rapidly through the filtering medium. And also in such manner as enables the operator to cleanse the filter, or the filtering medium, by means of the said pump, without necessarily taking to pieces, or even opening the filtering apparatus when the said medium or filter has become foul by use.

And, secondly, in the use of one uniformly pulverised substance, only for the filtering medium, or of such substances only combined as can be brought to the same degree of fineness as powder, and are of the same specific gravity, or as nearly so as possible, and in the application of two very finely perforated plates at the top, and two at the bottom of the filtering medium, between which plates the medium is pressed, and by means of which the liquid to be clarified, is introduced into the said filtering medium in a very minutely divided state. And in further compliance with the said proviso, I, the said George Price, do hereby describe the manner in which the said invention is to be performed by the following statement thereof, reference being had to the drawing annexed, and to the figures and letters marked thereon (that is to say):—

Description of the Drawing.

Fig. 1, is a vertical elevation of a filtering apparatus, with a double-branch rising main force-pump applied thereto, according to the said invention. In fig. 1, A, is a filter. B, is what I call a double-branch rising main force-pump. C, a suction-pipe or main for drawing up, by means of the pump, the liquid to be clarified, say, for instance, water from a river, or other source, D. D, E^1, and E^2, is the double-branch rising main of the pump, conveying the water to the top or bottom of the filter at pleasure, dependant on the opening and shutting of the cocks at E^1, and E^2. At F^1, F^2, are cocks for the exit of the water from the filter above and below, according as the filtration is by ascent or descent. The cock at E^1, is stopped, and that at E^2, is opened, when the filter is worked by ascension, and the cock, at E^2, shut, and at E^1, opened, when it is worked by descension, and it is worked alternately and rapidly each way when the pump is used for the purpose of cleansing the filter, or the filtering material or medium, on which occasions the dirty water escapes at the cock, F^1, and F^2, alternately.

Fig. 2, is a vertical section. *b, b,* are two chambers, formed by the spaces between the bottom and top of the filter and the plates, *g, g*. These plates are made of metal perforated over their whole surface with holes about an eighth of an inch in diameter, and between these plates and the filtering material, thin sheets of perforated metal, with holes, say in number about three hundred to the square-inch, are placed in order to cause the ingress of the water in a minutely divided state into the filtering medium. The lower of these plates rests on a narrow ledge cast or made for them in the interior of the cylinder, which forms the body of the filter, and the upper plates rest on the upper surface of the filtering-medium, and are screwed down tight upon it, by means of the adjusting-screws shewn in the drawing. H, is here intended to represen clear silver-sand, or other filtering-media, of a sufficiently equal fine grain to filter the water, without being (when firmly and closely pressed between the plates, *g*, *g*,) deranged by the forcing of the water by the pump through the finely perforated holes in the said plates. The cleansing is performed by means of the two branches at E^1, and E^2, and the peculiar arrangement of cocks here shewn, without its being necessary to open the cylinder. By means of these cocks I am enabled to cleanse the filtering materials or the filter, by either: in the former case, introducing water alternately at the top and bottom of the filter, and forcing it rapidly through the medium up and down, by means of the pump, and discharging the dirty water alternately at the cocks, F^1 and F^2, till the filtering-material is thoroughly cleansed; or in the latter case, by merely washing out the chambers, *b*, *b*, with the pump, by letting water run in at each branch, and out at the cocks, F^1 and F^2, which will generally be sufficient, as the dirt usually collects in these chambers, and lodges there more than in the filtering-medium. Now, whereas it is evident that this filtering-apparatus is equally applicable to the clarifying of other liquids, though I have here described it as applied to river water, and it is only necessary further to state, that the filtering-media should be either of such weight, even grain, nature, or substance, and so kept together by means of the perforated-plates and adjusting-screws, hereinbefore described, as not to be disturbed by the ascending and descending action of the water when the pump is applied, either to cleanse the said media, or to work the filter. And I hereby claim as the said invention, first, the application of what I call a double-branch rising main force-pump, such as is hereinbefore described, furnished with stop-cocks, to filter liquids by ascension or descension, at pleasure, and to cleanse the filter or the filtering-media, by alternate ascending and descending filtration, at pleasure, in manner hereinbefore described, whereby I am enabled to draw the liquid from distant sources, and to clarify it and cleanse the filter much more rapidly and easily than heretofore. And, secondly, the application of the finely perforated-plates above and below an uniformly grained filtering-medium, such as silver-sand, powdered glass, pozzolána, and the like, also hereinbefore described, such plates or one of them being furnished with adjusting-screws, to cause a strong pressure of the said medium between the said plates. And the said invention being to the best of my knowledge and belief, entirely new, and never before used in that part of Her said Majesty's United Kingdom of Great Britain and Ireland, called England, Her said Dominion of Wales, or Town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the same, and that I do verily believe this my said specification doth comply in all respects, fully and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I do hereby claim to maintain exclusive right and privilege to the said invention.—In witness whereof, &c.

Enrolled December 14, 1838.

Specification of the Patent granted to Charles Searle, *of Fitzroy Street, London, in the County of Middlesex, for a New Description of Aerated Water or Waters, and which Method of Aerating is applicable also to other Fluids.*—Sealed May 24, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Charles Searle, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are described and ascertained in the words following (that is to say):—

I aerate water and other fluids, mineral, saline, saccharine, or spirituous, with oxygen-gas, and the compounds of oxygen-gas with nitrogen, and more particularly as it exists in that combination of oxygen with nitrogen, denominated by chemists the protoxide of nitrogen, by the ordinaray and well known methods of aerating fluids. The gases for the purpose of aerating water or any other fluid that it may be expedient to aerate, I make or obtain by the ordinary methods of preparation, or of producing them, well known to chemists. I claim the exclusive right or privilege of aerating water, and all other fluids, as above mentioned, with the before mentioned gases, namely oxygen-gas in its simple state, or in combination with nitrogen, and more particularly as it exists in that combination denominated protoxide of nitrogen, or the same in various proportions, as may be found useful. The super-saturated and aerated solution of the protoxide of nitrogen in pure water I denominate oxygenous aerated water, or "beverage" when the same is variously coloured, or otherwise, or flavoured with citric or tataric-acid, syrup, spice, alcohol, or other materials, to render it more palatable; when, too, it is sometimes found expedient to add to the protoxide of nitrogen, the aerating gas, an equal proportion of oxygen, or to aerate with oxygen exclusively, or the latter with an equal proportion of nitrogen, according to the nature and intentions held in view in the preparation; and when I mineralize the said "oxygenous aerated water" with iron, I dissolve therein the oxide of iron in the proportion of a grain (a little more or less) to the pint, according to the strength that may be required, as a remedial agent, and which I call "oxygenous areated chalybeate water" or to the water, previous to aeration, is the iron added, previously dissolved in one or other of the mineral or vegetable acids, as may be desired or found expedient.—In witness whereof, &c.

Enrolled November 24, 1838.

Specification of the Patent granted to Alphonsé René Le Mire de Normandy, *Doctor of Medicine, of Rouen, Département de la Seine Inferieure Franc, now residing at No.* 142, *Cheapside, in the City of London, for Improvements in the Manufacture of Inks and Dyes.*—Sealed August 1, 1839.

To all to whom these presents shall come, &c. &c., *Now know ye*, that in compliance with the said proviso, I, the said Alphonsé René Le Mire de Normany, do hereby declare that the nature of my invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following description thereof (that is to say):—

My invention and improvements consist in the first place, in replacing nut-galls by other substances containing tanin and gallic acid, or either, and converting into black, or purple, or blue-black, or other tints, the brown-green or otherwise coloured precipitates, which they produce when in combination with salts of iron, by the addition of other colouring matter, so as to produce a superior black or purple of different shades of colour applicable to writing staining, or dyeing.

Secondly, in a particular method of treating or operating upon campeachy wood(hæmatoxylum campechianum) by dissolving in its aqueous decoction, metallic salts and oxydes for the production of a purple dahlia colour, applicable also to writing, staining, and dyeing.

Thirdly, in a certain process of operating upon Chinese blue (cyanoferruret of iron) so as to produce a blue fluid, also applicable to the cases above cited.

Fourthly, in a certain way of combining catechu, and the extract of hæmatoxylon and decoction of campeachy with salts of iron, of alumine, and of potash, and salts of copper, and sulphate of indigo, in the production of a solid, semi-solid, and soluble ink, applicable to the same purpose as above; and, fifthly, in combining carbon with other colours and acids, so as to form an indelible writing ink, which cannot be defaced or obliterated by any known chemical agent, all of which inventions and improvements I will now describe under different heads. My first improvement, namely, the mode of superseding the use of nut-galls by other vegetable matters in the production of a black or purple colour of different shades, and applicable to the purposes of dyeing, staining, colouring and writing, I effect in the following manner:

I take either sumac, elm wood, chesnut, beech, willow, elder, oak, plum, sycamore, cherry, poplar wood, catechu, or any other wood or berry, or extract of vegetable substances, containing gallic-acid and tannin, or either, and put this, previously reduced to powder, into a copper full of common water, and boil it until a sufficiently strong decoction be obtained. The quantity of water, must vary of course, according to the sort of vegetable substance employed, catechu for example, requiring more water than sumac on account of catechu being almost totally soluble. To this I add a certain quantity of campeachy wood, of acetate and hydrate of deutoxide of copper, of sulphate of alumine and of potash, of sulphate of protoxide of iron, in quantities which vary also according to the vegetable material first employed, and gum-arabic, or the best sort of gum-senegal, in the proportion of 80lbs. or thereabouts for 340 gallons of liquid; also a variable quantity of sulphate of indigo, the whole of these last ingredients depending on the shade of the colour intended to be produced, it is not possible to indicate absolutely the proportions in which they are to be used, as the taste or fancy of the operator cannot be guessed at. In order, however, to guide the operator as far as I am enabled, I should say, that supposing a blue-black to be the colour wished for, and sumac, for example, the vegetable ingredient selected for the purpose, the proportions should be, for 340 gallons, Sumac from twelve to fifteen sacks, of four bushels each.

Campeachy, 200 cwt., or thereabouts, according as a new or old chip is used.

Gum-arabic, 80 lbs. or 1 cwt.

Sulphate of protoxide of iron, 1 cwt.

Acetate and hydrate of deutoxide of copper, 4 lbs.

Sulphate of alumine and potash, 37 lbs.

Sulphate of indigo, 6 lbs., or even more, according to the intensity of the blue cast desired.

If catechu were to be used instead of sumac, 1 cwt. I should say would be required, the proportions of the other materials remaining the same.

The variously coloured precipitates which salts of iron form in the solutions of the above cited vegetable astringent substances, all of which precipitates vary from the green to the brown (the decoction of nut-galls only yielding with salts of iron a dark purple) are the obstacles which have hitherto prevented the use of these vegetable substances, with a view to supersede nut-galls. But, by means of the sulphate of indigo, in various proportions, I obtain from the above cited substances, a liquid of different shades of colour from the dark blue, down to the most intense black, and which solution or fluid is applicable to either dyeing or staining, or may be employed as a writing ink to be used with every description of pen.

My second improvement consisting in a particular method of treating and operating upon campeachy wood, for the purpose of obtaining a fluid of that dahlia colour called "king of purples" also applicable to writing and dyeing, I effect in the following manner: I boil in a copper a certain quantity of campeachy wood chips in the proportion of twelve pounds to twelve gallons of water, until a strong solution is produced, and pour the boiling solution through a sieve upon one pound of acetate and hydrate of deutoxide of copper, previously pulverized, and to which I add, almost immediately, fourteen pounds of sulphate-acid of alumine and potash, or thereabouts, gum in the same proportions as for the black, namely, eighty pounds per 340 gallons of the liquid, and after a few days (two or three days are sufficient) a beautiful dahlia "king of purples" colour is produced.

My third improvement, consisting in a certain process of operating upon Chinese blue, so as to produce a blue fluid also applicable to the purposes of dyeing, staining, and writing, I effect as follows:

I take Chinese blue, that is a cyanoferruret of iron which contains no alumine, and grind it in water with oxalate-acid or bioxalate of potash (superoxalas potassee) adding also a sufficient quantity of gum. The proportions should be, for seven ounces of water,

Chinese blue	3 drachms.
Oxalate-acid of potash	1 drachm.
Gum...............	1 drachm.

I find, however, that there isadvantage in saturating the Chinese-blue with solution of tin, previous to mixing it with the water and the other ingredients, in which case I pour on a drachm of solution of tin upon the three drachms of Chinese-blue, and stirring it, adding, at the same time, a little water, then join the drachm of oxalate-acid of potash, pouring at the same time the remainder of the seven ounces of water, and the drachm of gum.

I have given here the proportions on a very small scale, it will thus be easy proportionably to augment them according to the quantity of blue-fluid the operator may wish to produce.

My fourth improvement, referring to the production of a solid, semi-solid, and soluble ink, of combining the salts of iron, of alumine and potash, of copper and the sulphate of indigo, with catechu extract of hæmatoxylon, and decoction of campeachy, is performed as hereunder written:

I take three drachms of catechu, one drachm of extract of hæmatoxylon, ten grains of acetate and hydrate of deutoxyde of copper, one scruple of sulphate of alumine and potash, one drachm of gum-arabic, one drachm of sulphate of protoxyde of iron, and a variable quantity of sulphate of indigo, evaporated to dryness, the whole of these ingredients being previously reduced to a fine powder; and I pour upon them as much of a strong decoction of campeachy-wood, as will make them, by stirring, into a thick-paste. This paste I dry, either by leaving it to itself, or by exposing it to a gentle temperature, or otherwise, and when dry, cut into squares or balls, or lozenges, or other figures of variable sizes, which, when mixed with water and dissolved in it, will form a very good black, or purple, or blue-black fluid, according to the quantity of sulphate of indigo employed. This is what I call the solid soluble-ink. To obtain the semi-solid one, I operate as above, and add from half-a-drachm to one drachm of uncrystallisable sugar or molasses, which prevents it from becoming hard.

Lastly, my fifth improvement, namely, combining carbon with other colours and acids, so as to form a really indelible writing-ink, which cannot be defaced or obliterated by any known chemical re-agent, I obtain in the following way:

I take twenty-four pounds of carbon (Frankfort lamp-black, is the sort I generally use) and grind it with a mucilage of gum and water (the proportion of gum is twenty-pounds for sixty gallons of water). I filter the mixture through a very coarse flannel, or through a funnel, the spout of which is stopped with a spunge, and add four pounds of oxalic-acid, to which mixture I add a variable quantity of decoction of cochineal and sulphate of indigo, according to the intensity or shade of colour desired.

Having thus concluded the mode of performing these my improvements, I would observe, that with respect to the first, I do not claim the use of sumac, catechu, or any other of the vegetable astringent substances, nor that of the sulphate of protoxide of iron, of the acetate of hydrate of dentoxide of copper, or of the sulphate of alumine and potash; but, I do claim, as one of my improvements, the use of the sulphate of indigo, in combination with the above, as a corrective of the green or brown precipitates yielded by the above astringent substances, when combined with the sulphate of iron, so as to form an ink or dye of a good black or purple colour. Secondly, I claim the method of acting and operating upon the decoction of campeachy-wood, by means of acetate and hydrate of dentoxide of copper, with sulphate of alumine and potash, for making a purple dahlia coloured fluid, for writing or dyeing. Thirdly, I claim the use of bioxalate of potash, with or without solution of tin, and the solution of tin with the bioxalate of potash, as a method of rendering Chinese-blue applicable to the manufacture of a blue writing-ink, stain, or dye. Fourthly, I claim as my invention, the method of combining together, and the use of catechu with extract of hæmatoxylon, and sulphate of indigo in the production of a solid, semi-solid, and soluble writing-ink. And, fifthly, I claim the application of oxalic-acid in combination with carbon, cochineal, and sulphate of indigo, for the purpose of forming an indelible writing-ink, which known chemical re-agents cannot remove or obliterate.—In witness whereof, &c.

Enrolled September 10, 1839.

Specification of the Patent granted to CALEB BEDELLS, *of Leicester, Manufacturer, for an Improvement in Gloves, Stockings, and other articles of Hosiery.*—Sealed January 21, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Caleb Bedells, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say) :—

My invention relates to a mode of applying elastic-bands of India-rubber (caoutchouc) web, in the making of gloves, stockings, and other articles of hosiery, and consists in placing such webs on the needles of stocking or knitting-frames, and producing thereon knitted fabrics, such as gloves, or stockings, or night-caps, or other fabrics produced in knitting-frames. And in order to give the best information in my power of the precise nature of my invention, and to distinguish it from other modes of applying the elasticity of India-rubber to gloves, stockings, and other articles of hosiery, and that the invention may readily be performed, I will, in the first place, remark, that I am aware that elastic-bands containing India-rubber, have been before applied to gloves, and other knit articles, in various ways; first, by enclosing strands or threads, by sewing them between two woven fabrics, or other substances, such as leather, and applied to gloves and other articles of hosiery.

Secondly, obtaining double fabrics, by weaving, and strands or threads of India-rubber have been drawn between such double fabrics, and such bands have been applied, by sewing to various articles of hosiery.

Thirdly, elastic-webs or bands have been obtained by weaving India-rubber threads, and by means of sewing, such bands have been applied to various articles of hosiery; and,

Fourthly, strands or threads of India-rubber have been applied or introduced into stockings, gloves, and other articles of hosiery in the act of making such fabrics, and by means of a long needle, or such like instrument, drawing threads of India-rubber through the several rows of stitches or loops, as they are formed in knitting-frames, and by this means producing elastic-tops to stockings, and other articles of hosiery.

Now, my invention consists in taking elastic India-rubber webs or bands, prepared suitably for the purpose, and running them on to the needles of stocking or knitting-frames, and working the knit fabrics thereon. The elastic fabrics, webs, or bands I prefer, for the purposes of my invention, are such as are produced in looms, (working with the shuttle and warp,) and are well known, and used for a great variety of purposes; and in weaving such webs, for the purposes of my invention the warp-threads of India-rubber may be covered in suitable covering-machines, or they may be uncovered thread, covered in the act of weaving, as is well understood in weaving such elastic-bands or webs, and the warp of such fabrics may be wholly of India-rubber threads, or partly of India-rubber and partly of threads or yarns of cotton, silk, or other fibrous substances, and I would state, that I do not confine myself to any particular description of elastic-bands of India-rubber, nor does the making of such bands constitute any part of my invention.

In weaving bands containing threads or strands of India-rubber, to be used according to my invention, I so arrange the warp, that there is a strong thread of cotton or other material, next to the selvage warp thread, or yarn, which strong thread is to be drawn before running the band or web on to the needles of a stocking or knitting-frame. By this means, when such thread is drawn, the selvage warp-thread or yarn, stands at a distance from the other wrap-threads, and the fabric from which such warp-thread has been drawn, will simply consist of the weft-threads, which will offer an open fabric for the passage of the needles, and the web or band so prepared may readily be run on to the needles.

It is well known, that in making elastic-webs or bands, by the application of India-rubber, that the threads or strands of that material are used when in a stretched and non-elastic state, and elasticity is obtained thereto by the application of heat. And in using such bands or webs according to my invention, I prefer them to be in their elastic state; and, in working according to my invention; supposing I am about to make a glove, or a stocking, or other article of hosiery, I take a length of India-rubber web of the length I desire the band to be, and stretch it out to the width of needles of a stocking-frame, according to the size I desire to make the top of the glove, or stocking, or other article, and by a wire, or other stretcher, having points at the ends, I keep the elastic-band stretched out to the desired width; I then run the selvage of the band over the heads of the needles, and commence working with the stocking or knitting-frame in the ordinary manner, by the hand or thread-carrier, laying thread on to the needles, which by means of jack and lead sinkers, is depressed between the needles, and passed into the eyes, or under the beards thereof, as is well understood, and the presser-bar closing, the beards allow of the elastic-band or web to be thrown or knocked off the needles; and the loops of thread, produced as above explained, will thereby be drawn through the elastic-band, and in the working of the machine, those loops will be carried back, on to the stems of the needles, and the hand or thread-carrier will lay a fresh quantity of thread on to the needles, which will be sunk between them by the sinkers, and the previously formed loops or work will be then thrown off the needles in the ordinary manner; the knitting of the glove, stocking, or other article, will then be gone on with in the usual way of making such work in knitting-frames, and in respect to stockings or other articles, it will only be desirable to remark, that in using elastic-bands according to my invention, it will not be necessary to make the top of the stocking double at the top, by turning over a portion thereof, as is now practised, and such is the case with gloves and socks, and other articles of hosiery, where one part has in like manner been folded over. From the foregoing description, it will readily be understood, that various articles of hosiery may have elastic India-rubber bands produced thereto in stocking or knitting-frames, for whatever be the article to be produced, whether stockings, gloves, socks, or other articles of hosiery, it will only be necessary to commence working, by putting a length of elastic India-rubber band or web, on to the needles, and then producing the article in the usual way of working. I would remark, that in case it is desired to have an elastic-band between two portions of knit-fabric; in such case I weave the elastic-band with a draw thread at each selvage, and first work by putting one selvage on the needles and producing the quantity of knit-fabric on that selvage which may be required, and having taken the work off the needles, I run the other selvage of the elastic-band on to the needles, and produce the quantity of knit-fabric required on the selvage. I would remark, that although I have described a particular mode of making the elastic-bands of India-rubber, for the purposes of my invention, I do not confine myself thereto; and although I prefer commencing the work, by putting the previously made web on to the needles, it will be evident that the web may be put on to knit-fabrics before taking them out of the knitting-frame, by running a width of elastic India-rubber band or web on to as many needles as have been at work, and have knit-fabrics thereon, and drawing the last loops through the elastic-fabric or web, and then by the operation called "binding off" the loops may be successively drawn through each other, and fastened. Or, a fastening of the knit-fabric, and the elastic-fabric may be accomplished by passing a thread of cotton or other fibre through the row of loops of the stocking-fabric, which have been previously drawn through the elastic-fabric, as above explained, and by fastening on each side, the two will be made fast. I do not, however, confine myself to a particular mode of combining elastic-webs (prepared by other means than the stocking-frame) with stocking-fabrics, so long as the combination takes place in the working of knitting or stocking-frame, or machine.

Having thus described the nature of my invention, and the manner of performing the same, I would have it understood, that what I claim as my invention, is the mode herein described of applying elastic India-rubber bands in the making of gloves, stockings, and other articles of hosiery. And such my invention to the best of my knowledge and belief being new and never before used in that part of her Majesty's United kingdom of Great Britain and Ireland called England, her said dominion of Wales, or Town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the same, and I do verily believe that this my said specification doth comply in all respects, fully and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to my said invention.—In witness whereof, &c.

Enrolled March 21, 1839.

Specification of the Patent granted to John Small, *of the Old Jewry, in the City of London, Merchant, for Improvements in the Manufacture of Thread or Yarn, and Paper, by the Application of certain Fibrous Materials not hitherto so employed.*—Sealed December 1, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Small, do hereby declare the nature of the said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say):—

The invention relates to the application of the vegetable fibre of the following substances; the banana, the plantain, the aloe, the fig, and palm trees for the manufacture of paper and cordages. And in order to give the best information in my power, I will proceed to describe the process to which such substances are to be submitted, in order to

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obtain the fibrous products; but I would first remark, that many matters have been of late years attempted to be used in the making of paper in substitution of rags, owing to the great demand for paper; and it is well known that the supply of rags is comparatively small, when considered in respect to the demand; hence it is desirable to obtain materials which may be suitable for the purpose, and at a cost at which the same may be beneficially employed; and further, it is desirable, if possible, that such materials should be of the growth of this country, or of some of her colonies, and it will be found that the substances above-mentioned, may be had in large quantities, and admirably applicable to the making of thread and yarn, and to be used in the making of paper.

The substances above mentioned, are first to be submitted to the process of being well crushed, then soaked, and well washed, by which means the fibre will be readily separated.

The crushing process is performed by rollers; such as are used for crushing the sugar-cane, are those which have been employed.

The fibre from these substances, is then to be treated by the ordinary process, when for making thread or yarn, to which hemp and flax are submitted; by this means most valuable thread and yarn may be obtained to be woven into fabrics, making paper, and for other purposes to which thread and yarn are usually employed. And when used for making paper, the fibrous materials are to be formed into pulp, and made into paper in like manner to what is usually resorted to in making paper from other fibrous materials; and in the making of paper, the same may be wholly of such substances as above mentioned, or the pulp thereof may be mixed with any other suitable pulp.

Having thus described the invention, I would remark, that I do not confine myself to any particular mode of obtaining the fibres from the above mentioned substances, nor to any subsequent process, in order to the making of thread, yarn, or paper therefrom. Nor do I claim any of such process or the machinery so employed, when uncombined with the production of thread, yarn, or paper, from such substances. But what I claim is the application of the vegetable fibres obtained from the banana, the aloe, the fig, the palm, and the plantain trees, in the making of thread, yarn, and paper.—In witness whereof, &c.

Enrolled June 1, 1839.

Specification of the Patent granted to NICHOLAS TROUGHTON, *of Broad Street, in the City of London, Gentleman, for Improvements in the Process of Obtaining Copper from Copper Ores.*—Sealed August 21, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Nicholas Troughton, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say):—

According to the ordinary mode of treating copper-ores, in obtaining copper therefrom, the ores are subjected to processes of roasting, and the vapours produced therefrom are permitted to pass into the atmosphere, and it is well known that some of such vapours are produced from the sulphur contained in the ores. Now the object of my invention is to obtain sulphur in the process of roasting-ores in place of permitting the vapours thereof to pass into the atmosphere; and,

Secondly, my invention relates to the obtaining of sulphuric-acid by the combustion of vapours produced in roasting copper-ores in the processes of obtaining copper therefrom.

And in order to give the best information in my power, for carrying out this, my invention, I will describe the means pursued by me. In place of submitting the ores to heat in reverberatory furnaces, as is the most usual practice, and whereby the vapours distilled from the ores, mix with those given off and produced by the fuel, I place the ores in retorts which are externally heated in a similar manner to what is described in my former patent, and thereby I am enabled to obtain the vapours from the ores, free from the vapours of combustion of the fuel employed, as will readily be understood, on examining my former specification. When I wish to obtain sulphur, I conduct the ends of the pipes leading from the retorts containing the ore into a chamber or vessel which I prefer to be of brick lined with fire-clay, and I construct such vessels about ten times the contents or dimensions of the retorts used, and there is to be a door or opening, through which a person can get to throw out the sulphur deposited, but such door is to be closed as air-tight as possible, when at work with the retorts and vessels. In roasting the ores to obtain sulphur therefrom, care is to be observed to admit as little air into the retorts, or any parts of the apparatus, as possible, in order to prevent the formation of sulphurous-acid, and the vapour distilled will pass into the chamber or vessel and quickly condense and fall in the form of sulphur, which may be removed at any time by shutting off the flow of vapour into the chamber and opening the door, and well ventilating the chamber with fresh air; a man may enter and remove the sulphur. When it is desired to make sulphuric-acid in the act of roasting copper ores in the processes of obtaining copper from such ores, I put the ores into similar retorts to those above-mentioned from which the vapours distilled are conducted by suitable pipes to vessels suitable for making sulphuric-acid, as is well understood in making sulphuric-acid by sulphurous-acid in place of letting such sulphurous-acid escape into the atmosphere, in combination with the products of combustion of the fuel employed. The requisite leaden vessels and apparatus employed in making sulphuric-acid, being well understood, and in its separate condition forming no part of my invention, it will require no description in this, my specification, my invention relating only to the beneficially using the vapours distilled from sulphuretted copper ores in the process of roasting such ores for the purpose of obtaining copper therefrom. And I would remark, that in order to produce sulphurous-acid from the sulphur contained in the ores, an opening such as is described in my former patent, should be formed in the door or cover of the retort, in order that the atmospheric-air should pass therein, or in place of air, steam may be employed, as is well understood.

Having thus described the nature of my invention, and the manner of performing the same, I would remark that I do not claim the separating the vapours distilled from the ores from those produced by the fuel employed, that having been done by my former invention, by which I brought such separated vapours to be operated upon by water; but what I claim as my invention, is, first, the mode herein described of obtaining sulphur in the processes of roasting copper ores, by causing the separated vapours distilled therefrom to enter a chamber and deposit sulphur therein. Secondly, I claim the combining the processes of making sulphuric-acid with that of roasting copper ores as above described, whereby I am enabled in both cases to obtain valuable products in place of their being driven into the atmosphere to the prejudice of the surrounding neighbourhood.—In witness whereof, &c.

Enrolled February 21, 1839.

NOTICE OF EXPIRED PATENTS.

(*Continued from p.* 181.)

Richard Roberts, of Manchester, Lancashire, Civil Engineer, for an improvement, or certain improvements, of, in, or applicable to, the mule, billy, jenny, stretching-frame, or any other machine or machines, however designated or named, used in spinning cotton, wool, or other fibrous substances, and in which either the spindles recede from and approach the rollers or other deliverers of the said fibrous substances, or in which such rollers or deliverers recede from and approach the spindles.—Sealed March 29, 1825.

James Hanmer Baker, of Antiqua, but now residing in St. Martin's Lane, Middlesex, Gentleman, for improvements in the arts of dyeing and calico-printing, by the use and application of certain vegetable material, or certain vegetable materials.—Sealed March 29, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 318.)

Maurice de Joungh, of Warrington, Cotton Spinner, for an improvement or improvements in spinning machines and preparation machines, generally called mules, jennies, stubbers, and any other machine to which his invention may be applied, whereby much labour hitherto done by hand, is performed by machinery.—Sealed March 29, 1825.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 124.)

Edward Sheppard, of Uley, Gloucestershire, Clothier, and Alfred Flint, of the same place, Engineer, for improvements in machinery for raising the wool of pile on woollen or other cloths by points, by which the process is much facilitated, and a great saving effected, and part of which improvements is also applicable to brushing, smoothing, and dressing such cloths.—Sealed March 29, 1825.

Thomas Parkin, of Bache's Row, City Road, Middlesex, Merchant, for a mode of paving, in a certain manner, parts of public roads, whereby the draft of waggons, coaches, carts, and other carriages is facilitated.—Sealed March 29, 1825.--(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 193.)

Rudolphe Cabanel, of Melina Place, Westminster Road, Lambeth, Surrey, Engineer, for certain improvements on engines or machinery for raising water, part of which machinery is applicable to other useful purposes.—Sealed March 30, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 190.)

John Heathcoat, of Tiverton, Devonshire, Lace Manufacturer, for new or improved methods of figuring or ornamenting various descriptions or kinds of goods manufactured from silk, cotton, flax, or other thread or yarn.—Sealed March 31, 1825.

Jacob Jedder Fisher, of Ealing, Middlesex, Esquire, for a new application of railways, and the machinery to be employed thereon. —Sealed April 2, 1825.

Simeon Broadmeadow, of Abergavenny, Monmouthshire, Civil Engineer, for an apparatus for exhausting, condensing, or propelling, air, smoke, gas, or other aëriform products.—Sealed April 2, 1825.—(*For copy of specification, see Repertory, Vol.* 1, *third series, p*. 305.)

William Turner, of Winslow, Cheshire, Saddler, being one of the people called Quakers, and William Mosedale, of Park Street, Grosvenor Square, Middlesex, Coach Maker, far an improvement on collars for draught horses.—Sealed April 2, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p*. 340.)

Robert William Brandling, of Low Gosforth, near Newcastle-upon-Tyne, Esquire, for certain improvements in the construction of railroads, and in the construction of carriages to be employed thereon and elsewhere.—Sealed April 12, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p*. 205.)

William Shalders, of Norwich, Leather Cutter, for a gravitating expressing fountain, for raising and conveying water, or any other fluid, for any other purpose.—Sealed April 12, 1825.—(*For copy of specification, see Repertory, Vol.* 3, *third series, p*. 132.)

William Gilman, of Whitechapel Road, Middlesex, Engineer, and James William Sowerby, of Birchin Lane, London, Merchant, for certain improvements in generating steam, and on engines to be worked by steam or other elastic fluids.—Sealed April 13, 1825.—(*For account of specification, see Repertory, Vol.* 1, *third series, p*. 369.)

Thomas Sunderland, of Crooms Hill Cottage, Blackheath, Kent, Esquire, for a new combination of fuel.—Sealed April 20, 1825.—(*For copy of specification, see Repertory, Vol.* 5, *third series, p*. 5.)

Charles Ogilvy, of Verulam Buildings, Gray's Inn, Middlesex, Esquire, for an apparatus for storing gas.—Sealed April 20, 1825.—(*For copy of specification, see Repertory, Vol.* 4, *third series, p*. 324.)

John Bloomfield, of Islington, near Birmingham, Warwickshire, Engineer, and Joseph Luckock, of Edgbaston, near Birmingham, aforesaid, Gentleman, for certain improvements in the machinery or apparatus for propelling vessels, which improvements are also applicable to other useful purposes.—Sealed April 23, 1825.

Lemuel Wellman Wright, of Wellclose Square, Middlesex, Engineer, for certain improvements on machinery or apparatus for washing, cleansing, or bleaching, of linens, cottons, and other fabrics, goods, or fibrous substances.—Sealed April 20, 1825.—(*For copy of specification, see Repertory, Vol. 7, third series, p.* 200.)

Augustin Louis Hunout, of Brewer Street, Golden Square, Middlesex, Gentleman, for certain improvements in artillery, musquetry, and other fire-arms. Communicated to him by a certain foreigner residing abroad.—Sealed April 23, 1825.

Thomas Alexander Roberts, of Monford Place, Kennington Green, Surrey Gentleman, for a method of preserving potatoes, and certain other vegetables.—Sealed April 23, 1825.

Samuel Ryder, of No. 40, Gower Place, Euston Square, Middlesex, Coach Maker, for an improvement in carriages, by affixing the pole to the carriage by new invented apparatus.—Sealed April 28, 1825.

Daniell Dunn, of King's Row, Pentonville, Saint James Clerkenwell, Middlesex, Manufacturer of Essence of Coffee and Spices, for an improved apparatus, for the pupose of beneficially separating the infusion of tea or coffee from its grounds or dregs.—Sealed April 30, 1825.—(*For copy of specification, see Repertory, Vol.* 3, *third series, p.* 67.)

William Davis, of Leeds, Yorkshire, and of the Bourne, Gloucestershire, Engineer, for certain improvements in machinery for reducing or converting wool into slivers or threads, of any desired length, unlike worsted, namely, presenting more numerously hair points projecting from the surface of the slivers or threads.—Sealed May 7, 1825.

Thomas Hill the younger, of Ashton-under-Line, Lancashire, Land Surveyor and Engineer, for certain improvements in the construction of railways and tram-roads, and in carriages to be used thereon, and on other roads.—Sealed May 10, 1825.

Edward Ellis, of Crexton, near Rochester, Kent, Lime Merchant, for an improved brick, or substitute for brick, manufactured from a material hitherto unused for or in the making of bricks.—Sealed May 14, 1825.

Samuel Pratt, of New Bond Street, Middlesex, Camp Equipage Manufacturer, for an improved manner of combining wood and metal, so as to form rails or rods adapted to the manufacture of bedsteads, cornices, and other works, where strength and lightness are desirable, which he denominates union or compound rods.—Sealed May 14, 1825.

John Charles Christopher Raddatz, of Salisbury Square, Fleet Street, London, Merchant, for certain improvements on, or connected with, steam-engines. Communicated to him by **Erust Alban**, of Rostock, Mecklenburgh, Schwerin, Doctor in Medicine. —Sealed May 14, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 140.)

LIST OF NEW PATENTS.

Charles Greenway, of Douglas, in the Isle of Man, for certain improvements in snuffers.—Sealed September 5, 1839.—(*Six months.*)

Bryan Donkin, of Blue Anchor Road, Bermondsey, Engineer, for an improvement or improvements to be used in the process of making paper by hand or by machinery. Communicated by a foreigner residing abroad. —Sealed September 5, 1839.—(*Two months.*)

Paul Robin, of Saint Paul's Chain, London, Gentleman, for improvements in spinning. Communicated by a foreigner residing abroad.—Sealed September 9, 1839. —(*Six months.*)

John Rapson, of Emmett Street, Poplar, Millwright and Engineer, for improvements in steering ships and vessels.—Sealed September 9, 1839.—(*Six months.*)

Frederick Brown, of Luton, in the county of Bedford, Ironmonger, for improvements in stoves or fireplaces.—Sealed September 9, 1839.—(*Six months.*)

Samuel Stocker, of High Holborn, Pump Maker, for improvements in beer, cyder, and spirit engines.—Sealed September 11, 1839.—(*Six months.*)

Moses Poole, of Lincoln's Inn, Gentleman, for improvements in apparatus applicable to steam-boilers in order to render them more safe. Communicated by a foreigner residing abroad.—Sealed September 11, 1839.— (*Six months.*)

Stephen Rogers, of the city of Bristol, Merchant, for certain improvements in building the walls of houses and other edifices. — Sealed September 16, 1839. — (*Six months.*)

Isaac Dodds, of Masbrough, and **William Owen**, of Rotherham, both in the county of York, Civil Engineers, for certain improvements applicable to railways, and in the construction and manufacture of wheels, engines, and machinery, to be used thereon, part or parts of which are applicable to other engines, and which wheels without a flange are also applicable for use on turnpike roads.—Sealed September 16, 1839.—(*Six months.*)

Job Taylor, of Pendleton, near Manchester, Joiner and Builder, for certain improvements in machinery or apparatus for cutting or forming ornamental mouldings or devices in wood and other materials.—Sealed September 19, 1839.—(*Six months.*)

William Newton, of Chancery Lane, for an improved machine or apparatus for weighing various kinds of articles or goods. Communicated by a foreigner residing abroad.—Sealed September 19, 1839.—(*Six months.*)

John Wertheimer, of West Street, Finsbury Circus, Printer, for improvements in producing ornamental raised surfaces on paper. Communicated by a foreigner residing abroad.—Sealed September 19, 1839.—(*Six months.*)

Thomas Todd, of Kingston-upon-Hull, Gentleman, for improvements in propelling vessels.—Sealed September 19, 1839.—(*Six months.*)

Henry Needham Scrope Sharpnell, of Gosport, Gentleman, for improvements in cork-screws.—Sealed September 26, 1839.—(*Six months.*)

Samuel Wilks, of Catherine Cross, Darleston, Stafford, Iron Founder, for improvements in boxes and pins, or screws for vices and presses.—Sealed September 26, 1839.—(*Six months.*)

William Henry Hornby, and **William Kenworthy**, both of Blackburn, Manufacturers, for certain improvements in the machinery or apparatus for sizeing, and otherwise preparing cotton, wool, flax, and other warps for weaving.—Sealed September 26, 1839.—(*Six months.*)

THE
REPERTORY
OF
PATENT INVENTIONS.

No. LXXI. NEW SERIES.—NOVEMBER, 1839.

Specification of the Patent granted to CHARLES FLUDE, *of Liverpool, in the County of Lancaster, Manufacturing Chemist, for Improvements in Applying Heat for Generating Steam, and for General Manufacturing and other useful Purposes, where Heat is required, and also for an Improved Mode of Supplying Steam-Boilers with Hot Water.*—Sealed November 3, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Charles Flude, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):—

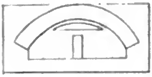
My invention consists of certain modes and modifications of applying heat for generating steam, and for general manufacturing and other useful purposes, where heat is required, and also for an improved mode of supplying steam-boilers with hot water. The first part of my invention consists of further improvements, consequent on a patent taken out by myself, dated January 30, 1838, for improvements in applying heat for the manufacture of alkalies and salts, and for smelting, or otherwise working ores, metals, and earths, whereby, in addition to the coal giving off the requisite quantity of heat for carrying on such manufacture, the useful product of coke is obtained.

Having in that patent fully described the nature of the improvements by which the coke-oven is rendered efficient for the performance of processes, by means of the waste heat, to which it was before incompetent, it will not here be necessary to repeat them, but simply to premise that they consist of the employment of hot air for burning the smoke, and the use of a hopper, or feeding-hole, by which fresh portions of coal or slack (small coal), is introduced from time to time, to keep up and maintain the regularity of the flame; I shall therefore now proceed to describe the improvements to which this patent refers.

Description of the Drawings.

Figs. 1 and 2, sheet A, shew a mode of dividing the coke-oven into two fires. The floor is twelve inches high, being formed of one course of bricks laid flat, and two courses set on edge, the side walls are three bricks, or twenty-seven inches thick, and the front and back walls two bricks, or eighteen inches thick; the space between the two side walls is eight feet nine inches, and the distance between the front and back walls is seven feet; the arch is one and a half bricks thick, or fourteen inches, and springs about twelve inches high from the floor, the rise being two feet, making the under side of the arch three feet from the floor; the space between the sidewalls is divided by a nine-inch wall, of fire-brick, which gives two coking chambers, of seven feet by four feet in the clear; this wall I build about two feet high, as it is unnecessary to carry it up to the arch. In the front wall

Fig 1



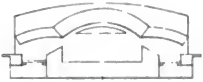
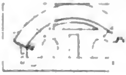


Fig 3



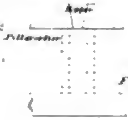


Fig II

SHEET A.

Fig 2

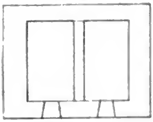


Fig 16

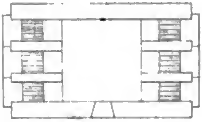


Fig 4

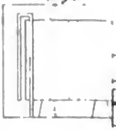


Fig 13

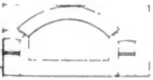
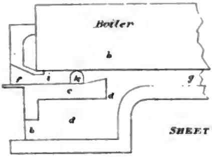
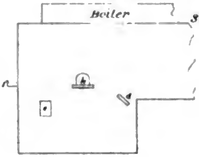


Fig 22



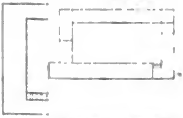
SHEET B.

Fig 24

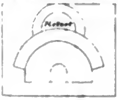


Side View

Fig 19



Transverse Section



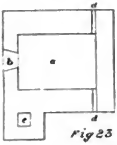
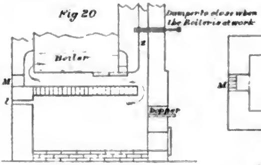


Fig 23

Fig 20



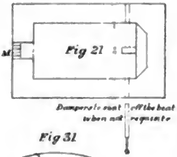
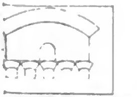


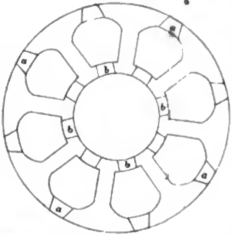
Fig 21

Dampers to shut off the heat when not requisite



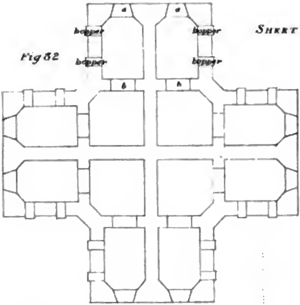
... under the floor of the Oven

Fig 31



SHEET B

Fig 32



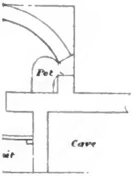
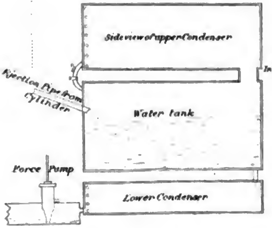
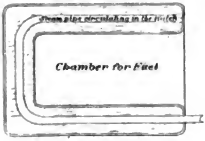


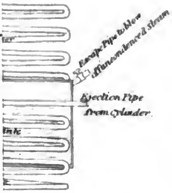
Fig 36



Inlet for Steam to upper Condenser

Plan of Tender




Escape Pipe to blow off uncondensed Steam
Ejection Pipe from Cylinder
...ank

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are two doors, about twenty-two inches by twenty-two inches, for charging the coals and withdrawing the cokes. Above the dwarf wall a feeding hole or hopper is made about four feet wide and ten inches deep; the fire arch is seven feet in length, being built with a straight edge with the front and back walls, and taking no bearing on them; the hopper should be furnished with an iron projecting plate, to afford a better stop for the coals, a section of which is shewn at fig. 6. The ovens are used thus:—they are first brought to a red heat by waste fuel, as described in my former patent of January 30, 1838, and as is well known; the cinders, &c., being cleared out, each division is charged with about 1800 weight, more or less, of coal or slack (small coal), and the doors built up with bricks, and plaistered with clay, or mortar, and when sufficiently coked, (known by the entire absence of flame,) the coke charge is withdrawn by an iron rake or peel, and a fresh charge of coal or slack is introduced, and the doors bricked up as before. The above sized charge will work about twenty-four hours, according to the draught, and one side should be charged about twelve hours later than the other, by which means a greater uniformity of flame is obtained, one side being fresh when the flame from the other is getting weak. The ovens though divided, thus act as one, both fires discharging their flame at the back into the furnace, or under the boiler or pan to be heated; the hopper is kept stopped with coal or slack, which is pushed in upon the coke from time to time, when it is requisite to augment the flame. The dimensions here given, are merely given as examples, as I do not confine myself thereto; the thickness of the walls will generally be the same, but the size of the fires will vary according to local circumstances; the above sizes will, however, be generally found most convenient and effective. The walls must be strongly braced by iron wall-plates and ties, or braces, as is usual in binding together and securing large furnaces.

Figs. 3 and 4, shew the same construction, with the addition of hot-air flues, for more effectually burning the smoke; now as this principle is fully described in my former patent before recited, I shall only now describe an improved mode of constructing them. This consists in making a flue under the floor of the oven, (near the side) and connecting it at the back, with the first flue in the side wall; the second turn is made to rise at the front, (see fig. 4,) and returns again to the back; it then takes three more turns on the arch, and eventually discharges through the arch, in front of the oven; the air then has to traverse through six turns of hot surface, and then passes over the fire, from front to back. The bottom flue under the floor I make about four inches square; it is four and a half inches below the fire, being covered by a brick on edge; the two turns in the wall I make about one and a half inches wide, and six inches deep, the lower flue being partly below the back of the oven floor. These flues are separated by a course of bricks laid flat, and are half a brick thickness (four and a half inches) from the fire. The three returns on the arch are separated from the fire nine inches, or one brick's thickness, and are generally built of a triangular shape, as shewn in fig. 3; they are about three inches diameter; they are separated from each other by the thickness of a brick, (two and a half inches); the opening through the arch is obtained by leaving out one brick; the number of turns may be increased by making additional flues under the floor, but I prefer six turns on each side as above, viz. one under the floor, two in the side wall, and three on the arch.

A further improvement consists of placing the hopper above the arch of the oven; when built thus, I denominate the top arch, the flashing-arch. The lower arch should not be less than fifteen inches (or one and a half brick) thick, and must be levelled out to form the floor of the flashing-arch; this is surmounted by a nine-inch arch, commencing in a line with the lower arch, and ending at the back of the fire-bridge; its height in the centre is about fifteen inches, and it is reduced at the back (by raising the floor) to about six inches, as shewn in fig. 6. This is to protect the end of the arch from the double heat, and also to prevent the small coke resulting from the slack, employed for flashing the furnace, from getting down among the coke below, the hopper opening in front is reduced in depth to about ten inches, by a four-inch arch, or ring, nine inches in length, as also shewn in fig. 6. This is to make a better stop for the coals. When the ovens are built this way, I prefer making the hot air discharge through the arch in front (above the oven door), the mouths or entrances of the air-flues being furnished with iron frames and slides, or registers, to regulate the draught, the oven doors being tightly luted up. The coke-oven then works entirely by hot air passing over the fire, from front to back, where it encounters the smoke from the flashing arch, and consumes it more or less. I prefer making the feeding-hole, or hopper, (of the flashing arch) large, say five feet wide, by ten inches deep, in the centre, reducing in depth at each side. The flashing arch may also be built below the floor of the coke-oven (see fig. 7).

Fig. 8, shews the mode of applying the flashing arch below the floor of the oven, for heating a reverbatory chamber; and,

Fig. 9, shews the mode of applying the same for evaporating fluids, (as in the manufacture of alum and alkalies,) when the flame is made to play over the surface of the liquid in question,—percolator, or hollow fire-bridge.

A further improvement consists of constructing a small chamber, to be filled with the small coke resulting from a former operation, at the back of the coking-oven (or in any other convenient part), so as to insure a clear fire, for the smoke from the raw coal in the hopper to pass over and amongst, before passing into the furnace, or under the boiler or pan to be heated; the flame and smoke thus becoming intensely heated by the obstruction offered by the red hot coke to its passage.

Now I would have it distinctly understood, that I do not claim originality, as far as regards the principle of burning smoke, by passing it over the surface of a clear fire, the same having to my knowledge been adopted many years since to furnaces of various constructions, but I do claim the combination of this principle with a coke-oven when applied after the manner here shewn. The mode which I prefer is the following. The back wall of the oven is built thicker than the ordinary, say twenty-seven to thirty-six inches, as shewn in fig. 10, upon this nine-inch pillars or piers of brick, stone, or other suitable material, are to be built across the back of the oven on the wall or bridge, leaving spaces of three to four inches between them as shewn in fig. 11, these piers are to act as walls to keep the coke from falling down into the oven or chamber: the flame and smoke passes through the spaces between them from the coke-oven to the chamber to be heated, the space between the two lines of piers is eighteen inches, dwarf-wall or walls may be used to confine the coke or cinders, instead of the open piers, but if so, a larger space must be left between them and the arch, to allow the free passage of the flame. A door is shewn on the side, which should be about fourteen inches by fourteen inches, to be closed by an eighteen inch fire-tile, luted up, or made tight by clay. This door is for charging and regulating the small cokes, or a mixture of coke-cinders and coal, or slack used for the purpose described: or instead of the door above described, the opening may be made in the form of a hopper, and kept stopped with small coal or slack; it is sometimes convenient to have two such openings, one on each side the furnace. This I believe to be the most convenient situation and arrangement, but the principle may be applied in various ways, with a beneficial effect.

I prefer building the arch of the coke-oven with a slight inclination or rise from front to back, as shewn in fig. 10, this arch should not be built beyond the front of the bridge or commencement of the piers, a separate arch of greater thickness and substance being carried over the portion occupied by the piers and coke-fire, which I denominate "the percolater;" I prefer building the piers and the arch over them of fire-stone, as it withstands the heat better than bricks. This arrangement will be found advantageous for balling and puddling iron for smelting metals, &c. Coke-ovens may also be combined with advantage, with common furnaces working in the ordinary way with bars. The coke-oven being employed to give the greater part of the heat, the smaller fires being merely used as auxiliaries to augment, increase, or maintain the flame, these smaller fires may be built in or between the walls of the coke-oven or ovens, as shewn in figs. 12, 13, 13½, or they may be applied externally, and would be found advantageous for smelting purposes, and where the ordinary consumption of fuel is large, the coke-oven or ovens, being employed to give a greater part of the heat, and thus effect a great economy of fuel.

Ovens with Bars.

Fire bars may also be combined with the close floor of a coking-oven, by which means the combustion of the fuel is quickened at the expense of a portion of the resulting coke, which is thus consumed. Figs. 14, 15, 16, 17, 18 and 19, shew this arrangement.

Fig. 14, shews a range of short bars in front of the oven (say six inches in length); and,

Fig. 15, shews the same arrangement at the back of the floor, or they may be placed lengthwise, as in figs. 16 and 17, an opening being made under the floor, to give a draught through the said bars, as in figs. 18 and 19; the mouths of these openings may be closed by doors, so as to regulate or shut off the draught. The application of bars to a portion of the floor of a coke-oven, in order to quicken the combustion of the fuel, may be modified in a variety of ways, but the principle is the same in all, a portion of the coke being sacrificed for this purpose.

Fig. 20, sheet B, shews a longitudinal section of the oven, as applied for heating steam-boilers, and evaporating vessels. The door and hopper may be placed either in front, or at the side, (the former mode will generally be found most convenient;) the arch is built of the best fire-bricks, and may be made nine, fourteen, or eighteen inches thick; I prefer a fourteen-inch arch, (1½ brick,) built about twelve inches in advance of the front of the boiler, to prevent the first strike of the flame from injuring the bottom thereof. A portion of the same may also be protected by a shield, or casing, of fire-bricks or tiles. The fire-bridge or exit-flue is placed in front of the oven, the flame passing between the arch and the front wall, a space of about twelve inches being left for the purpose. The boiler is to be placed about fifteen inches above the top of the fire-arch, the space between constituting the flue. The flame then passes along the whole length of the boiler, front to back, and then returns round the sides of the boiler in the usual way; but when applied to very long boilers, the oven need not extend the whole length, as seven or eight feet will be found sufficient. A flue being carried under the boiler, the remaining distance from which the flame rises and passes round the sides of the boiler as before described. The boiler thus receives the radiant heat from the fire-arch, in addition to the heat given out by the flame. z, is a chimney, to be used only when the heat is required to be shut off from the boiler, for the purpose of repairs, &c.; this chimney when not in use is closed with a damper. The front and back walls should not be less than two bricks and a half, or twenty-two inches thick, and the side walls three bricks, or twenty-seven inches. The extra chimney should also be two and a half bricks thick, except the front, which may be eighteen inches, as shewn in the drawing.

Fig. 21, shews a horizontal section of the oven, shewing the fire-bridge, or mouth of the flue, where the flame first rises, and also shewing two openings in the side walls, each to admit a fire-tile or damper, for shutting off the heat from the boiler during repairs, &c. These openings may be closed by moveable bricks, when the oven is at work. *l*, shews one of two openings, five inches by three inches, at the back of the oven, to be stopped also by moveable bricks, which are to be taken out when it is requisite to cool the arch. The air flues formerly described, are not essentially necessary, when the oven is applied in this mode, as the holes, *l*, *l*, may then be used, to induce a draught from back to front, but the said hot-air flues may be very beneficially used, being made to open either at the back of the oven, (the apertures, *l*, *l*, being closed,) or the said hot-air flues may be brought through the side walls, at or near the fire-bridge in front; the apertures, *l*, *l*, are then to be left open, or partially stopped, according to the draught. It must be understood that the chimney shewn in the drawing, is not the chimney ordinarily used when the boiler is at work, but only when it may be necessary to cool down the boiler. Where this chimney is inconvenient (as in a building), a flue may be carried outside the boiler, to the working chimney in lieu thereof. M, shews an aperture about fifteen inches by twelve, to be built up with moveable bricks, which are to be removed when the cooling operation is necessary, a large body of cold air then enters and circulates the flues of the boiler, in passing to the ordinary chimney-shaft. Another mode of heating steam-boilers, and large evaporating vessels, is as follows: A space of about fifteen inches is left between the arch of the coke-oven, and the bottom of the boiler; the oven discharges its flame at the back, and a hopper is built in front above the arch, similar to that before described as the "flashing arch," but in this case no brick arch will be necessary above the arch of the coke-oven, as the bottom of the boiler or pan supplies its place; this hopper is used in the same manner as the flashing-arch, the red hot fuel being pushed toward the back of the floor, from time to time, to make room for a fresh supply of coals to the hopper; the bottom of the boiler or pan then receives all the radiant heat from the clear fire on the flashing-floor in addition to the flame given off from the hopper. Where it is practicable, it is advantageous to introduce a damper through the side wall, at the back of the coke oven, to shut off the heat from the boiler when requisite, a flue being provided through the front or side of the oven to carry off the heat externally, as before described. The flashing-floor may be discharged in front through the hopper, or a side opening may be provided to extract the more burnt and expended portions of fuel from the back; this opening may, during the time the boiler is at work, be kept stopped with small coal or slack.

Figs. 22, 23, 24, sheet B, shew this arrangement. *a*, the coke-oven. *b*, the door for charging the coals, and withdrawing the coke. *c*, the arch of the coke-oven. *d*, the fire-bridge with side openings to admit two damper tiles to shut off the heat when required. *e*, the space-flue to be used when *d* is shut off. *f*, the hopper mouth. *g*, the flue; and *a*, the boiler. *h*, the return flue round the sides of the boiler. *i*, the flashing-floor. *k*, the opening to extract the cinders.

I have now described what I consider to be the best mode of increasing and maintaining the flame from a coke oven by means of the hopper or flashing-arch, but various other means may also be adopted with a beneficial effect. Wood, oil, tar, fat, or other combustible substances, may be introduced into the oven or furnace by pipes or any other convenient means for producing the same effect. Or a brick, stone, or metal chamber, may be constructed on the top of the arch or in the furnace itself, or in any other suitable situation in connection with the coking-oven, as shewn in figs. 28, 29, 30, sheet A, to be filled (or nearly so) with coal or slack, and closed tightly by a door luted up by clay loom, &c.; this chamber then acts as a retort and discharges the gas and volatile matters from the coal contained therein into the coking-oven or at the bridge thereof, or into the furnace or chamber attached to the same. When the flame is expended the retort must be drawn, emptied of the coke resulting from the carbonization of the coal, and a fresh charge introduced, repeating the operation as often as necessary. Hydrogen-gas or carburetted hydrogen-gas, obtained by any known chemical means, as the decomposition of water, passing steam over and through ignited charcoal or coke by means of pressure, or otherwise, the destructive distillation of coal or other combustible substances, may also be beneficially employed as a means of increasing the flame of a coke-oven for obtaining heat for smelting and manufacturing, or other useful purposes; the retorts, &c., being placed outside the coke-oven and heated by separate fires; but I prefer the mode above described of feeding the coke-oven or the flashing furnace in connexion therewith, through a hopper, with coal or slack, (small coal,) in the manner already pointed out.

Figs. 31 and 32, sheet B, are outline drawings, shewing the mode of applying coke-ovens for those operations requiring very excessive heats, as in the manufacture of glass, porcelain, pottery, and earthenware, &c., the ovens are here placed below the kilns, &c., and four, eight, twelve, or any requisite number may be thus made to throw their combined heat immediately into the centre of the furnaces, kilns, &c., built above them, the draught of the whole being upward, no divisional walls in the throat or flue will be necessary; they may, however, be used as shewn in the drawing, but such walls must be built entirely of the best description of fire bricks or lumps and fire-clay, and should not be connected above with any portion of the work, as they are sure either to fuse or porcelainize more or less. The air-flues may then be made to discharge into the glass furnace direct. This mode of applying the ovens for the operations described, I consider the most convenient, as they are then separated by a floor from the manufactory, which is thus freed from all dust, smoke, &c., and the arch, formerly occupied by the tieze hole or fire door, may be occupied by an additional crucible or pot, but the ovens may be beneficially employed above, as well as below, by attaching any number of them to the outside of the kilns or furnaces employed.

Figs. 33, 34, 35, sheet A, shew the mode of heating glass furnaces from below, more in detail. I have hitherto described the oven with its improvements, as employed for converting the fuel into coke; but in some localities, "coking," or "soldering" coal or slack, is difficult to obtain, and expensive in the carriage. In such situations the oven may still be used with considerable advantage, working it in the following manner: The oven is to be charged with coal or slack, as if intended for coking (free burning or "swift" coal or slack, is best adapted for this purpose); when the flame is burnt off and exhausted, the charge in the oven is not drawn as in coking, but the flashing-arch, or hopper, is worked as before described, fresh portions of coal or slack being supplied, as may be requisite, to increase the heat of the furnace; when too large an accumulation of cinders arises, a portion must be withdrawn, to make room for a further supply of slack or coal for maintaining the heat.

If the oven is provided with a flashing-arch, it is advantageous to close the mouths of the air-flues (or nearly so), as soon as the flame is burnt off from the first charge of coal, by which means a strong dead heat is obtained, which lasts for several days, the flame being renewed as often as requisite by the flashing-arch. But the construction best adapted for this mode of working, is that where the feeding-hole or hopper opens direct into the oven, as in fig.3, sheet A, through which a portion of the cinders may be discharged when requisite to make room for a further supply, or the cinders may be discharged by an opening at the side or back of the oven, where strong heats are requisite, as in working iron, &c. I have found that it is unnecessary to charge and draw the oven more than once a week, the flame having been kept up during that time, by feeding with small quantities of coal or slack, by means of the hopper; by which means a saving of nearly fifty per cent. in the expense of fuel was effected, and a large quantity of useful cinders was produced at the same time, and a considerable advantage also arose from the saving effected in the ordinary waste of scrap-iron, worked in the furnace, by preventing oxidation from the unburnt air passing through furnaces of the ordinary construction, the air being by the above mode of working nearly entirely burnt and deoxidized. I therefore claim the combination of a close hearth or floor, and an arch with a hopper or feeding means, working in the way described, whether accompanied with air-flues or not. I have now to describe a furnace of a peculiar construction, for burning slack or coal without converting the same into coke, or only producing very small coke, of inferior quality; it consists essentially of a close floor, covered in by an arch. I construct it as shewn in fig. 27, sheet A. This furnace is built in the same way as the flashing-arch before described, when in combination with the coke-oven; the arch, however, in this furnace is about eighteen inches from the floor, in the highest part, and gradually slopes down towards the back, as shewn in the figure 27, where the height reduces to about twelve inches. An arch is built across the back of the floor, so as to give a clear passage beneath it, of about two feet six inches; this is for the purpose of extracting the cinders, &c., an aperture, figs. 25 and 26, of about twenty-four inches by twelve inches, being made through the floor, for that purpose; this aperture may be closed by a fire-tile, or by an iron plate secured by a cross bar. A feeding-hole or hopper is shewn in front, furnished with a projecting iron plate or shelf, or the front wall may be built about eighteen inches before the front of the arch, to afford sufficient lodgement for the slack or coals. The furnace is used thus: It must be first brought to a red heat, by throwing in ignited fuel, (as before described with regard to a coke-oven;) the hopper is then to be filled with slack or coal, and as the flame becomes burnt off, the coal or slack is pushed forward by a rake, and the hopper refilled as before described in reference to the flashing-arch of the coke-oven. A door about fourteen inches by fourteen inches, is shewn in the side wall, through which the workman adjusts the ignited fuel, which (when all the flame is burnt off,) should be pushed back till it nearly touches the depressed part of the arch at the back, the raw smoke and flame from the hopper then passes over and amongst the fuel as before described with regard to the "percolater" of the coke-oven. When the furnace becomes filled, the plate or tile is removed from the discharging-hole at the back, and the more burnt and exhausted portions are pushed through the discharging-hole in the floor, by a rake, by means of the side-door before mentioned; the aperture is then closed, and the remaining portion of the clear fuel is pushed on, so as to nearly refill the space at the back of the arch, to obstruct, and thereby increase the heat of the flame and smoke, in its passage to the reverbatory chamber or furnace to be heated, the side door being replaced, the hopper is refilled, and the operation goes on as before, the fresh fuel being supplied in front, and the more exhausted portions being removed at the back. This I believe is the most simple and convenient mode of constructing and applying the furnace, which may either be used singly, or two or three may be combined, so as to throw their united flame into the furnace, or under the boiler or pan, to be heated. Hot-air flues may also be beneficially added, making a flue under the floor (covered by thin tiles), from front to back, rising through the side walls, and returning over and above the arch, discharging the heated air through the same in front just behind the hopper (see fig. 27). An arch of common bricks may be employed to form the flue above the fire-arch, which should be of fire-bricks, as should the inside of the walls next the fire. The mouth of this air-flue may be regulated by a slide or register, as before described; in some situations it will be more convenient to discharge the cinders through the side opening before described, instead of the trap in the floor; this will be regulated by local circumstances. Now various sizes, shapes, and forms, of constructions may be contrived for attaining the end here proposed, but I believe the form described is the simplest, and best calculated for the purpose; fire-bars may be introduced in a portion of the floor, to quicken the combustion of the fuel, as shewn and described at figs. 14 to 19, in reference to the coke-oven, but they will seldom be necessary, and for many purposes inconvenient. What, therefore, I claim is, the combination of a close hearth and arch, whether a portion of the same be confined with fire-bars, in the way described, or not, so long as the close hearth occupies the greater surface, as by this arrangement a much more gradual and perfect combustion of the coals or slack is obtained, and the dead heat is easily maintained, even when the furnace is not fed for hours, particularly when no fire-grate or bars are used. Another important advantage is, that it admits of nice regulation with respect to the quantity of air passing into and through the furnace, which I have found of great advantage in smelting and working metals, particularly with regard to iron, when no bars were used, and considerable saving in the waste of material will be found to take place, by preventing the oxidation produced by the unburnt-air passing through the bars or furnaces of the ordinary construction.

Mode of Supplying Steam Boilers with Hot Water.

The ejection-steam from the cylinder, instead of being blown off into the atmosphere, as is usual in locomotive engines, is conducted into the water-tank, either on the surface of the water, or by allowing the pipe to dip two or three inches into the same (see fig. 36, sheet c), the uncondensed steam passing through a chamber, about three fet high, divided into a series of partitions, by thin plates of iron, or other suitable material, the partitions being one inch and a half, and one inch in diameter; the larger partitions being closed at each end, and communicating at each alternate end laterally, by a line of six or seven two-inch pipes (see fig. 37), the partitions are to be placed in a right line with the carriages, by which means every alternate division will constitute a wind flue, the velocity of the draught being increased by the speed of the engine; it is for this reason that the communication between each steam-chamber, or box at the ends, is made by pipes, instead of closed steam-boxes; as the open spaces between the pipes allow the passage of cold air, by which means both surfaces of each partition or steam-box is considerably refrigerated. A three-inch pipe is carried from the top of the last steam-box (outside the tank), to a second condenser of the same construction, (but only about eighteen inches deep,) placed below the tank, the last steam-box of which is furnished with an escape-pipe, regulated by a stop-cock, to allow the small portion (if any) of still uncondensed steam to escape. A pipe is also attached to the bottom of this condenser, to carry off the condensed water to a small cistern, shewn in fig. 36, from which it may be raised to the supply-tank, by a force-pump, worked by the engine. A series of pipes may be substituted instead of these steam-boxes, on the same principle, each pipe of the upper condenser being laid with a trifling inclination toward the tank, to conduct back the condensed water; or, the steam may be conveyed from the cylinder through a coil of pipes placed in the tank (as in ordinary condensers as applied to stills) so as to heat the water in its passage. The lower end of this pipe communicates with the lower condenser from the last pipe or steam box, of which a connection is made with the upper condenser, which in its turn discharges its condensed water into the the tank, as shewn in the drawing; but I prefer the steam boxes as above described, formed of one-eighth of an inch plate-iron, zinc, or other suitable material.

Fig. 36, shews two cocks, the small one to be used as a jet to ascertain the presence of water, and the larger one to let off the same (when accumulated) into the tank; or dip-pipes may be employed to discharge the condensed water from the bottom of the condenser, the said pipes being carried nearly to the bottom of the tank, as will be easily understood by engineers. The dimensions and admeasurements here given may be varied according to circumstances, as I do not confine myself thereto.

Having thus described the nature of my invention and the manner of performing the same, I would have it understood that what I claim as my invention is; first, I claim the mode of dividing coke-ovens into two or more compartments as shewn at figs. 1, 2, 3, 4, sheet A, whether the same be accompanied by hot-air flues and feeding means or not.

Secondly, I claim the combination of a coke-oven with a flashing-arch or feeding-means, as shewn and described at figs. 5, 6, 7, 8, and 9, sheet A.

Thirdly, I claim the mode of increasing the heat and burning the smoke of coke-oven, shewn and described at figs. 10 and 11, sheet A.

Fourthly, I claim the combination of common fires with coke-ovens, as shewn and described at figs. 12, 13 and 13½, sheet A.

Fifthly, I claim the combination of fire-bars or grates with a coking hearth or floor, as shewn and described at figs. 14, 15, 16, 17, 18 and 19.

Sixthly, I claim the mode of heating steam-boilers and evaporating vessels, as shewn and described at figs. 20, 21, 22, 23 and 24, sheet B, whether the same are furnished with side flues or not, and whether the draught is from front to back or in any other convenient direction.

Seventhly, I claim the general application of the oven to steam-boilers and evaporating-vessels when combined with hoppers, or feeding-means, or air-flues, or both.

Eighthly, with respect to the manufacture of glass, porcelain, pottery, and earthenware, I claim the general application of the waste heat of coke-ovens to the particular purposes aforesaid.

Ninthly, I claim the mode of heating glass furnaces by fires situated beneath the glass furnace, instead of being placed in the furnace itself as hitherto practiced, whether such fires be of the ordinary construction or any of the constructions above described, plans of which are shewn in sheets A and B.

Tenthly, I claim the combination of coke-ovens with feeding-means, when the heat of such ovens is employed for smelting or manufacturing purposes or for heating steam-boilers or evaporating-vessels, whether such end be obtained by introducing combustible substances, gasses, or any of the means above described.

Eleventhly, I claim the mode of constructing furnaces for the combustion of slack or coal, shewn and described at figs. 25, 26 and 27, sheet A.

Twelfthly, I claim the mode of condensing steam, shewn and described at sheet C, and thus obtaining hot water for supplying the boilers of locomotive-engines on railways.

Thirteenthly, I claim the combination of a close floor, or partially close floor, and arch and feeding-means, or common fires, or both, as before described, whether the same be employed for making coke or not, so long as the same is used and applied for heating purposes according to the mode and description above specified and explained.—In witness whereof, &c.

Enrolled May 3, 1839.

Specification of the Patent granted to Samuel Parker, *late of Argyle Place, but now of* 170, *Piccadilly, in the County of Middlesex, Lamp Maker, &c., for Improvements in Stoves.*—Sealed December 20, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Samuel Parker, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention relates to that description of stoves, the temperature of which is regulated by the quantity of air admitted to support the combustion of the fuel.

And my invention relates, first, to improvements in the construction of close stoves, and in regulating the supply of air to such stoves, by means of the water which is used as the means, or partly the means, of transmitting the heat of the fuel to the apartments or buildings, in which the stove is used; and my invention relates,

Secondly, to applying a mode of regulating the supply of air to closed stoves, which are now commonly known as Arnott's stoves, such regulation being performed by means of water or air, as hereafter explained; and in order to give the best information in my power, I will proceed to describe the drawing hereunto annexed.

Description of the Drawing.

Fig. 1, represents the section of a stove, constructed according to my invention. *a, a,* is a cylinder, within which the fire-grate is situated; the outer circumference of the cylinder, *a, a,* being double to contain water, and the water-space is closed at top and bottom, opening, however, to the atmosphere, by means of the pipe, *c,* at which point the water-space, *a, a,* is filled from time to time with water, to make up for the slight evaporation which goes on. *d, d,* are what I call circulating-pipes, connected at their upper and lower ends with the vessel, *a, a;* the object of this arrangement is to obtain a constant circulation of the water in the vessel, *a, a.* It will be seen that the fire-place or grate, *e,* is capable of being raised higher or lower, according to the desire of the parties using the same, and will be found a means of aiding the regulation of the temperature of the surrounding water, the higher the grate is raised, the less effectual circulation will be obtained, and consequently, less temperature to the stove in general. *f,* is the flue passing to a chimney, or other proper outlet, for the products of combustion. *g,* is an open vessel, containing water, placed at the upper part of the stove, there being a projecting-ring which descends from the bottom of the vessel, *g,* and enters a groove containing sand, as shewn at *h,* the nature of which is clearly shewn in the drawing; and it will be seen that there is a tube through the vessel, *g,* which I prefer to cover with glass, or have a hole in the cover, covered with glass or talk, as it enables me to see the state of the fire at all times, without removing the cover. *i,* is the air-supply pipe, which I prefer to be so arranged as to receive air from a point, as near the ceiling of the room as possible, in order to withdraw the air therefrom, which will thereby withdraw the most impure air in the

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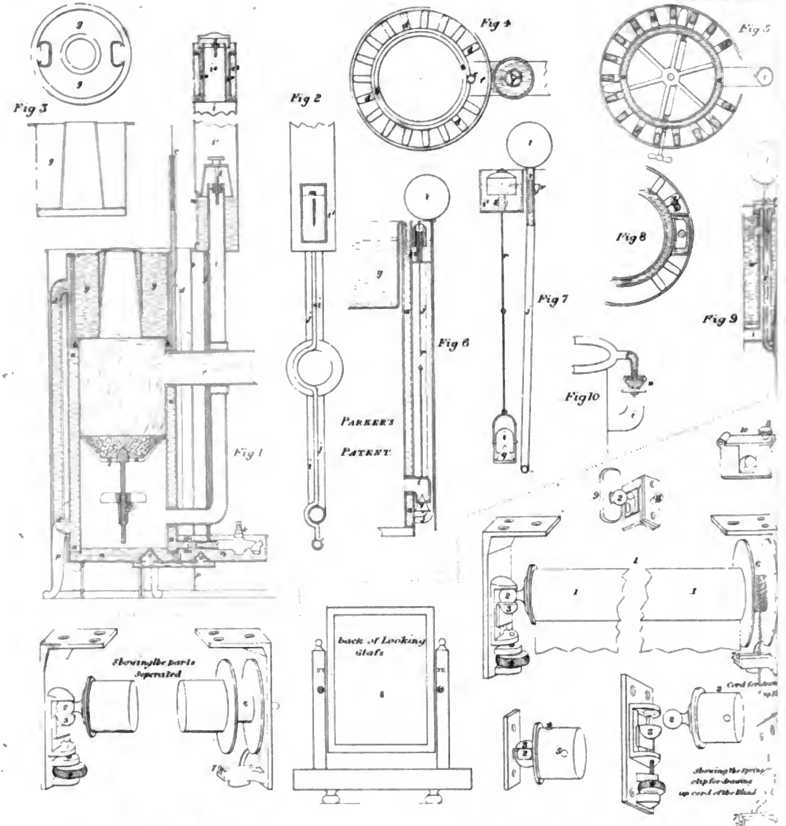

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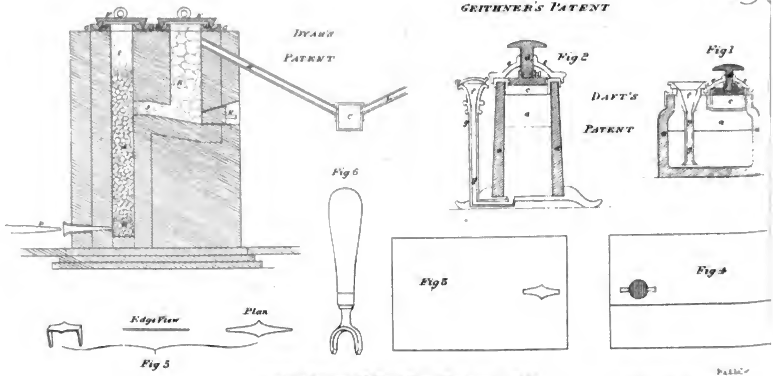

LONDON Hodson 112 Fleet Street November 1 1839.

Pattie

room, to supply the quantity required for combustion; and I also apply in conjunction (or separate) with the other regulating means, apparatus to regulate the supply of air, to operate by the temperature of the room, in which the stove is placed. i^2, is a continuation of the air supply-pipe, and i^3, is a surrounding vessel to that pipe. The vessel, i^3, is to contain air, and the upper part of the tube, i^2, has a cover or valve inverted over it, and the upper part of the vessel is covered with fluid, such as oil or water, or suitable fluid; i^4, being a pipe which descends to the lower part of the vessel, i^3; consequently the quantity of fluid on the upper surface of the vessel, i^3, will depend on the expansion of the air produced by the heat of the room, and thus will the quantity of air which can pass into the air-pipe be regulated. I would remark that, it will be evident that various modifications of apparatus may be resorted to, for employing the expansion of air, by the heat of a room, to open and close the air-passage of a stove; but whatever be the arrangements, they will necessarily be modifications of this part of my invention, which consists of the application of such means of expanding air, to the regulating the supply of air to stoves. The pipe, *i*, enters below the fire-grate, and the quantity of air allowed to enter, will be regulated in the following manner: i^1, is an enlarged tube, into which the tube or pipe, *i*, enters, and I am thereby enabled to surround the upper part of the pipe, *i*, with water, as is indicated by the drawing; the water in the tube, *i*, communicating with the water in the vessel, *a*, by means of the small tube, *j*; and *k*, is a cock for drawing off the water from the vessel, *a*. *l*, is a hood or cover to the pipe, *i*, and it will be evident that, according as the water is nearer to, or farther from, the inverted cover, *l*, so will be the space open for the air, to pass between the upper surface of the water, in i^1, and cover, *l*, and pass into the pipe, *i:* thus supposing things to be in the condition indicated by the drawing, and the temperature of the water in the vessel, *a,* be considerably increased, the effect would be that the water, by expanding in the vessel, *a,* would cause the water in the pipe or tube, i^1, to stand at a higher level than at present shewn in the drawing, which would contract the opening between the upper surface of the water, and the inverted cover to the pipe or tube, i^1, by which means the quantity of air passing to the fire in a given time, would be reduced, and the temperature lessened. In the vessel or tube, *i,* I insert a plate of glass, *m,* by which I can observe the level of the water, and by observing the temperature produced after having filled the vessel, i^1, to any particular height, and observing what is the temperature to which the quantity of air supplied, under such circumstances; I can mark such glass plate, and by such means I can obtain a guage, to indicate to what extent to fill the vessel, i^1, in order to obtain the degree of temperature of the stove I require, and the desired level of such water can at all times be obtained by supplying water to the vessel, *a,* as before explained, or by withdrawing water from that vessel by the cock below. *n,* is a pan, at the bottom of the stove; this pan contains water, and consequently makes a water-tight joint to close the stove, as is shewn. *o, o,* are perforated plates, to filter the water in its passage and prevent any dirt passing, and this arrangement will be found to be an advantageous plan of making the stove air-tight, except at the air supply-pipe, *i,* or if preferred, other means may be resorted to, for making the lower part of the stove air-tight. The pan containing the water can be raised or lowered with facility, as is indicated in the drawing by dotted lines. *p,* is an external case, which opens at bottom and top, consequently, there will be a constant circulation of air from below upwards, which will become heated and passes into the room where the stove is being used.

Fig. 2, shews the pipe, *i,* i^1, separately.

Fig. 3, a plan, and section of the water-vessel, placed at the upper part of the stove.

Fig. 4, is a plan of the stove.

Fig. 5, a section of the stove. In each of these figures the same parts are indicated by the same letters of reference.

I will now proceed to describe another arrangement, by which the expansion of the water regulates the quantity of air admitted to the fire, to support combustion.

In figs. 6, 7, and 8, *a*, *a*, shews part of the stove, similar to that of fig. 1, and *i*, is the air supply-pipe, which, in this case, is worked by a valve, *q*, suspended by wires, *r*, which are connected to the float of cork, or other suitable material, as is shewn in the drawing; the object of this arrangement is to compensate for the loss of water by evaporation, and at the same time, keep a more accurate and certain level of water in the vessel, i^1. The water in the vessel, i^1, being connected with the vessel, *a*, by means of the pipe or opening, *s;* and *t*, is a vessel having a tube, which enters, and closely fits the pipe, *j*, which enters at the lower part of the vessel, *a*, and *v*, is an opening, acting on the principle of the bird-glass. It will be evident that as water evaporates, air will pass in at *v*, and enter the globe or vessel, *t*, and allow of a quantity of water to pass out therefrom, which will thus keep the level of the water to the point above *v*, whilst water in i^1, will be at a somewhat higher level, owing to the expansion, and any increase or decrease of expansion of the water in the vessel, *a*, will immediately act on the valve, and regulate the size of the opening through which air (to support combustion) can pass.

I will now proceed to explain the nature of the apparatus for regulating the supply of air by a water apparatus.

Fig. 9, shews a vessel, *w*, which is conveniently placed or attached, in such manner that the heat of the stove will heat the water in the vessel, *w*. The air to the stove is supplied through the tube, *i*, and the quantity of air supplied, will depend on the space between the cap, *x*, and this cap can be raised or lowered by hand, the object being to obtain a constant level to the surface of the water in the pipe, *j*, and thus regulate the supply of air between the surface of the water in the vessel, *w*, and the bottom of the cap, *x*, in order to regulate the temperature of the stove, which is performed by similar apparatus to that last described, and is marked by the same letters of reference.

Fig. 10, shews a mode of accomplishing the same object, by the use of water or air confined in tubes or vessels, having a flexible valve, *z*, and is applied to stoves as above described.

Having thus described the nature of my invention, I would remark, that I lay no claim to any of the parts separately, but what I claim as my invention, is; first, the mode of constructing the stove shewn at figs. 1, 2, 3, 4, and 5, and the modes of regulating the supply of air, by means of the expansion of water, as above described, in respect to figs. 1, 2, 3, 4, 5, 6, 7, and 8.

Secondly, I claim the application of the apparatus described at figs. 9 and 10, for regulating the supply of air to the fire-place of a close stove.

Thirdly, I claim the mode of making a close stove, by means of a water-joint, as described in fig. 1; and,

Fourthly, I claim the mode of regulating the supply of air to close stoves, by means of the temperature of the room in which the stove is used, as above described.—In witness whereof, &c.

Enrolled June 20, 1839.

Specification of a Patent granted to Frederick Benjamin Geithner, *of Birmingham, in the County of Warwick, Brass Founder, for Improvements Applicable to the Drawing or Winding up of Window and other Roller Blinds or Maps, which Improvements are also Applicable to other useful Purposes.*— Sealed October 13, 1836.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.— *Now know ye*, that in compliance with the said proviso, I, the said Frederick Benjamin Geithner, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention consists in the application and arrangement of certain mechanical parts for obtaining an improved movement for drawing or winding up and letting down of window-blinds, maps fixed on rollers, part of which improvements I also apply to certain descriptions of looking glasses, called dressing or swing-glasses. And in order that my invention may be fully understood, and the manner in which the same is to be effected or performed, I will describe the drawing annexed.

Description of the Drawing.

Fig. 1, represents a roller-blind complete, having my improvements applied thereto.

Fig. 2, shews a perfectly smooth globular ball which I make of iron or any other metal or composition, and which I firmly rivet, or otherwise fasten, to the collar as represented.

Fig. 3, shews a clip with corresponding concave beds, to receive the said ball, and which clips I make of brass or any other suitable metal, and I sometimes inlay or line the bed or concavity of the said clip with leather or other suitable material to obtain a smooth and easy movement.

Fig. 4, shews a thumb-screw, which, acting either as a contracting or expanding power upon the clip, serves on the one hand to cause a sufficient friction to keep the blind in any given position (and which, by means of the screw, may easily be increased); or, on the other hand, by a contrary revolution of the screw the friction is diminished or the ball may be entirely released and the blind removed at pleasure. I sometimes reverse the parts of my said invention, attaching the clip to the collar or roller, placing the ball on the opposite part of the furniture, see fig. 5. I do not confine myself to the screw only for regulating the clip, I sometimes apply a spring-weight, or any other mechanical power, to effect this object.

Fig. 6, represents a roller with two sides to receive the line necessary for winding up the blind, underneath this roller is fixed a clip-guide, fig. 7, which is slightly compressed by means of a small spring or any other power, and which causes the line travelling through this guide to wind itself tightly round the the roller, preventing it getting entangled and keeping it in its proper situation on the rollers when the blind is drawn down.

Fig. 8, represents a dressing-glass to which my ball movement is applied, for the purpose of swinging or turning the glass, instead of the screws commonly used for this purpose.

Fig. 9, shews a ball firmly fixed to a small plate, one apparatus of this description is attached to each standard of the swing-glass.

Fig. 10, shews a metal-box with a moveable bed or clip, one such is to be fastened on each side of the frame of the swing-glass to receive the ball, which being acted upon by a small screw, fig. 11, presses on the clip sufficiently to produce the desired friction, and which, after being regulated by a few revolutions of the screw, does not require alterations, or sometimes I use only one of the above apparatus supplying the other side with any convenient movement or pin.

I lay no claim to the inventon of any particular mechanical part of the roller-blind or maps already in use, nor to the parts of the swing looking-glasses, excepting the application of the ball-movement and clip-guide herein described, these I sometimes use separately or together as best suits my purposes. But what I claim are the improvements above described :

First, the apparatus consisting of the ball-movement with adjusting sockets or bearings for window and other roller-blinds, and for swing looking-glasses as above described.

And secondly, the clip-guide for the drawing-up cords of roller blinds and maps, as above described.—In witness whereof, &c.

Enrolled April 13, 1837.

Specification of the Patent granted to HARRISON GRAY DYAR, *of Mortimer Street, Cavendish Square, in the County of Middlesex, Gentleman, for Improvements in the Manufacture of Zinc.*—Sealed November 20, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Harrison Gray Dyar, do hereby declare the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

According to the ordinary modes now pursued for manufacturing metallic-zinc, the oxide of zinc, mixed with coal, is submitted to a process of distillation, by enclosing oxide of zinc, prepared for reduction in retorts, crucible-pots, or such like vessels, and by heat applied to the external surfaces of such retorts or vessels, the metal is reduced from the oxide, and is driven off, and condensed in suitable receivers; this is necessary to protect the zinc from the action of the air.

Now the objection of my invention is, to accomplish the same end, without enclosing the zinc in such vessels, by depriving the air of those properties or matters, which would injuriously act on it, and the ore or oxide of zinc prepared for reduction is exposed to the direct action of the fire. The burning fuel in the furnace being so placed or arranged, in relation to the ore placed in the furnace, that the air, after passing through the fuel, shall, before it comes in contact with the ore, be deprived of those properties or matters, which would otherwise be prejudicial to the process of obtaining a metallic zinc; and in order to give the best information in my power, I will describe the means and apparatus resorted to by me, for carrying out my invention, and which I believe to be the best arrangement for the purpose.

Description of the Drawing.

The drawing represents the section of a furnace, suitably arranged for carrying out the invention, and I would, in the first place, remark, that in arranging the furnace or apparatus properly, for performing the invention, that its arrangement should be such (whatever may be its form) as to possess the capabilities hereafter explained, whereby metallic zinc may be advantageously manufactured from the ore or oxide of zinc prepared for the purpose, by an exposure to, or by means of, what may be called a naked fire, in contradistinction to the zinc being protected from the fire, by being placed in retorts, crucibles, or such like vessels, as heretofore practised. The general nature of the means whereby this modification of the process of smelting is rendered practicable with zinc, consists in so arranging the furnace or burning fuel, in relation to the ore of zinc, or unreduced zinc, and the zinc after reduction, as that when the hot burnt air, or gaseous products of the combustion, shall come in contact with the ore of zinc prepared and placed in the furnace for reduction, there shall be in this hot or burnt air little or no free oxygen, carbonic acid, or other gases or vapours capable of oxydizing metallic zinc. By this method the necessity of enclosing the unreduced zinc (in whatever substance or combination it may exist) in retorts, crucibles, or other such vessels, is avoided, and instead thereof the hot or burnt air is deprived of those matters which make the enclosing necessary; it should be understood that the burnt air, or products of combustion, should only contain carbonic-oxide, nitrogen (or azote), hydrogen, carburetted-hydrogen, or such other gases or vapours as are incapable of having any prejudicial action upon metallic-zinc, at the temperature which may be used in reducing zinc, and that after the hot or burnt air has acted on the prepared zinc-ore, it shall be so far cooled as that none of the zinc, in the state of vapour or otherwise, shall pass into the external air, so as to be burnt, oxydized, or otherwise lost. A, is the fire-chamber filled with coke. B, the chamber, where the prepared ore is placed to be reduced. C, a recipient for the condensed zinc reduced and distilled from the ore. D, a pipe from a blowing machine. E, a closed place, that can be opened to clear out the furnace. F, F, two covers of cast-iron, for getting at the chambers, A and B. G, G, are cast-iron pieces, with a groove, either circular, or of such a shape as to receive the projecting sides or edges of the covers, and being filled with sand to make a closed joint, as shewn at H. I, is the upper part of the fire-chamber. K, an iron pipe, through which the burnt air and vapourized zinc passes and are cooled, to condense the metal which falls into C. L, a pipe opposite to K, of sufficient length before opening into the air to condense all the vapour of zinc, and so far cool the burnt air as that it may pass into the atmosphere, without carrying away any of the zinc. N, a place for opening into the chamber, B, to clear out the refuse left from the prepared ore, after the metal is separated.

In this furnace the height of the fire-chamber, A, below J, is intended to be sufficient to convert the oxygen in the air, feeding the fuel entirely into carbonic-oxide, by the time it passes through the channel, J, to enter the chamber, B. The channel, J, is made to descend towards N, to prevent any zinc from at any time flowing towards the fire-chamber, A. When the ore contains cadmium, arsenic, &c., I recommend that a series of two, three, or more of the parts, K, C, L, be added, connected, one after the other, so that the zinc, which is most easily condensed, may be chiefly collected in the first recipient, whilst the more volatile cadmium, &c., will be received in the second or third. Thus may be obtained the zinc in the first recipient more pure, than if all the metals had been condensed together.

My invention does not relate to any peculiar mode of preparing the ore for reduction, but I prefer when the ore is naturally in the form of an oxide of zinc, or is converted into an oxide, previous to being operated on, to make it up in balls about two inches in diameter, with the usual quantity of fine coal and a little clay, or such other substance as may be calculated to keep this prepared ore from falling into a powder in the chamber, whereby it might prevent the free circulation of the hot air around, and amongst the prepared ore, in the chamber, B, whilst being reduced. I would remark that, although I have described a mode of driving the air through a high column of coke, in order to convert the oxygen of the air into carbonic-oxide, yet to further ensure entire conversion of all the oxygen into carbonic-oxide, I recommend the precaution of filling at each operation, or charging the furnace,—the upper part of the furnace, A, with bituminous coal, so that the heat will distil off carburetted hydrogen, to produce the effect upon the burnt air, of converting all the carbonic-acid inte carbonic-oxide, by mixing therewith in passing through the channel, before it arrives at, or amongst the ore, in the chamber, B. It will be obvious to those who are acquainted with the chemical principles upon which my invention is founded, that the ores of zinc may be placed along with the fuel in the chamber, A, so as to produce, ultimately, a result similar to that which I have explained, provided at the last part of the operation or reduction, the air that has passed through the fuel has attained the condition hereinbefore mentioned, of being without those properties or matters which would act upon metallic-zinc, but I prefer keeping the fuel and the unreduced zinc separate, in the manner I have above described.

Having thus described the nature of my invention, and the manner of performing the same, I would have it understood that, although I have been particular in describing the construction of furnace, or apparatus and fuel, I prefer, I do not confine myself thereto, in respect of form, arrangement, or fuel, so long as it is suitably arranged for carrying out my invention, and I would have it understood that what I claim as my invention; is, the reducing the ore, or oxide of zinc, as hereinbefore described and explained, by means of a furnace so arranged or contrived that the hot or burnt air, after passing through the fuel, shall, before, or at the time, it arrives amongst the ore or zinc, be deprived of the properties or matters which render necessary the enclosing of unreduced zinc and reduced zinc, in the ordinary process, as above described.—In witness whereof, &c.

Enrolled May 20, 1839.

Specification of the Patent granted to THOMAS BARNABAS DAFT, *of Regent Street, in the County of Middlesex, Gentleman, for Certain Improvements in Ink Stands, and in Materials and Apparatus for Fastening and Sealing Letters or other Documents.*—Sealed February 2, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Barnabas Daft, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

The first part of my invention has for its object certain improvements in ink-stands, by means of which ink will be supplied for use when required, in better condition than by ink-stands of any other constructions now in use, and the ink will be preserved from the action of the external atmosphere, and the supply of fresh ink will be caused by the pressure of air. And further owing to the construction and arrangement of part of my improvements in the event of any derangement of the parts allowing of the atmosphere entering above the ink, it cannot flow out of the ink-stand; and,

Secondly, my invention relates to improved fastenings and apparatus to apply the same to the fastenings of letters and other documents.

Description of the Drawing.

Fig. 1, represents the section of an ink-stand, constructed according to my invention. *a, a,* being the reservoir or vessel in which a supply of ink is contained; and I would remark, that this vessel may be of glass or any suitable material, and the shape may be varied according to taste. *b*, is a cover to the upper part of the vessel, *a*, such cover being affixed by cement or otherwise to such vessel, *a*, and in an air-tight manner. *c*, is a short cylinder affixed on the cover, *b*, by a screw or otherwise. On the lower part of this cylinder, *c*, is a cover or bottom, and there is an air-way passing from the top downwards through the side, and entering into the cylinder, *c*. The object of having the air-way in an indirect way into the cylinder, is, in the event of the ink-stand being turned over, that the ink may not get into the cylinder, *c*. On the inside of the cylinder, *c*, there is a piston, which is well packed or fitted, in order to its moving air-tight in the cylinder, such piston being worked by a screw, *d*, working through the cover, *e*, of the cylinder, *c*. It will, therefore, be seen that the rising or lowering of the piston will influence the air in the vessel, *a*, for it will be evident that the air contained in the cylinder, *c*, when the piston is forced downwards, will be forced into the vessel, *a*, and will drive out a quantity of ink therefrom into the ink-holder, *f*, for use, and in the withdrawing of the piston to the upper part of the cylinder, *c*, the pressure of the atmosphere acting on the ink in the holder, *f*, will force back the ink into the vessel, *a*, and any deficency of quantity of the ink from what previously existed in the vessel, *a*, will be compensated for by an equal quantity of air- passing in through the ink-holder, and to the upper part of the vessel, *a*. And I would call particular attention to this circumstance, because it distinguishes ink-stands or ink-holders made according to my invention, from those previously in use, wherein a plunger or such like instrument has been used, to force the ink out of a vessel containing ink, into an ink-holder, such ink-stands acting on the principle of forcing ink out, by means of displacing it by a substance which is in contact with the ink, and are therefore liable to get quickly out of order; whereas, ink-stands or ink-holders mode according to my invention, the ink is forced into the ink-holder, by the pressure of air which is forced into the vessel, *a*, displacing a like quantity of ink from that vessel, and therefore there is a quantity of air above the surface of the ink, and the instrument by which the air is forced or blown into the vessel, *a*, in order to press out the ink therefrom; and I would remark, that although I have shewn the air-pump or apparatus for forcing air into the vessel, *a*, to be at the upper part of the ink-stand or ink-holder, yet it may be placed in any convenient position. The top of the ink-holder, *f*, is above the level at which the ink can at any time stand in the vessel, *a*; consequently in case of any derangement of the air-pump or blowing apparatus, which would allow of a flow of air into the upper part of the vessel, *a*, the ink cannot flow away therefrom, which is a fault possessed by some constructions of ink-stands, wherein the ink is retained within the ink-stand or vessel, by the pressure of the atmosphere, brought into action by withdrawing a plunger, acting on, or in, the ink. *g*, is a tube affixed to, and descending from, the lower part of the ink-holder, *f*; this tube descends to nearly the bottom of the vessel, *a*, and there is a portion of fine woven silver-wire cloth, or other suitable material, covering the lower end of the pipe or tube, *g*, which acts as a strainer, and prevents any thick ink passing up to the ink-holder. The ink-holder, *f*, is affixed to a circular plate or cap having a screw, by which it is screwed over the opening formed in the cover, *b*, of the vessel, *a*, in an air-tight manner, and it is by removing this cap that the ink may be supplied to the vessel, *a*, or there may be a separate opening, having an air-tight covering or cork, at which ink may be supplied to the vessel, *a*, and it will be evident, that whatever be the position of the ink in the vessel, *a*, so long as it is above the lower end of the tube, *g*, on screwing down the piston in the cylinder, *c*, there will be a quantity of ink forced into the ink-holder, *f*, and, as above stated, on the withdrawing the piston upwards, whatever quantity of ink has been used or removed from the ink-holder, will be compensated for by a like quantity of air passing into the vessel, *a*, through the ink-holder, and it will be evident that my invention simply acts by pneumatic-pressure on the ink, caused by a piston working in a cylinder, superadded to the vessel, *a*, and it is important to remark, that when the ink-holder, *f*, does not contain ink, the ink-stand may be turned over, and no ink will flow from the vessel, *a*, so long as the air-pump or blowing apparatus remains inoperative.

I would remark, that, although I have shewn the air-pump or blowing apparatus to consist of a cylinder, *c*, and piston, and I prefer that arrangement, I do not confine myself thereto, as it will be evident that other arrangements of apparatus may be employed to force air into the vessel, *a*, in order to displace the ink therefrom, when a supply is desired to the ink-holder, *f*.

Fig. 2, shews the section of another arrangement of ink-stand, constructed according to my invention, differing, in some respects, from that above described. The parts are marked with the same letters of reference, and the description above given, will for the most part apply to this arrangement, and it will only be necessary to remark, that in place of the tube, *g*, passing through the cover of the vessel, *a*, it passes out from the bottom thereof, and as the ink-holder at the upper part thereof as shewn; and further, the bottom of the cylinder, *c*, opens into the vessel, *a*; consequently, if this ink-stand be turned upside down, the ink would come in contact with the piston, and if any portion dried thereon, might impede its action. This arrangement I do not therefore consider so suitable for being moved from place to place, where there is a liability of its being carried the wrong way upwards, but for all purposes where it is not liable to be turned and carried in different positions, it will be found equally suitable with the one first described.

Having thus described the first part of my invention, I will now proceed to describe the second part of my invention, which relates to means of fastening letters and other documents. This part of the invention consists of a mode of applying thin plates or bands of metal, fastened by sealing-wax, or other proper means of fastening letters and documents.

Figs. 3 and 4, shew the front and back side of a note, fastened by a thin plate of metal, the ends of which having been passed through the note, are fastened to the paper at the back, by sealing-wax. The plate or band may be of any suitable metal. I prefer very thin brass, gilt or silvered, but do not confine myself thereto.

Fig. 5, shews the metallic-plate or band separately, in plan and edge-view, bent to enter the perforations made through the note or other documents. I make the plates or bands by means of a fly-press, and I form the dies for stamping according to the device persons may desire, such as a coat of arms, a crest or other design, according to taste, which is impressed on the shield or enlarged part of the band or plate.

Fig. 6, shews the instrument for perforating the note, letter, or other document desired to be fastened. This instrument has two cutting edges, as shewn in the drawing, the note, letter, or other document being folded, two holes are made through the several folds by the instrument fig. 6, and the ends of the metallic-band are passed through those holes, and the ends are folded down, and fastened by means of a seal, formed by sealing-wax, as is shewn; or the same may be fastened by a portion of paper and wafer, or other proper means, on which may be pressed a seal as in the ordinary manner of sealing or fastening a letter.

Having thus described the nature of my invention, and the manner of performing the same, I would have it understood that what I claim as my invention is, first, the mode of displacing ink in ink-stands, by means of the pressure of air forced into the vessel, *a*, and filling up the spaces previously occupied with ink, by air passing to the upper part of the vessel, *a*, as above described. Secondly, I claim the application of the ink-holder, *f*, above the level of the ink in the vessel, *a*, of such ink-stands as depend on the pressure of the atmosphere, for returning the ink back to the vessel, *a*, (or such like ink vessel,) whereby in the event of any imperfection or derangement of the apparatus for pressing out the ink, the ink will not be allowed to flow away as above described. Thirdly, I claim the application of a strainer or filter in the passage or way between the vessel, *a*, and the ink-holder. And, fourthly, I claim the means and apparatus for fastening letters, notes, and other documents, as above described.—In witness whereof, &c.

Enrolled August 1, 1839.

Specification of the Patent granted to CORNELIUS ALFRED JAQUIN, *of Huggin Lane, Wood Street, in the City of London, for Improvements in the Manufacture of Buttons.*—Sealed July 7, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Cornelius Alfred Jaquin, do hereby declare the nature of my invention and the manner in which the same is to be performed, are fully described and acertained, in and by the following statement thereof (that is to say):—

My invention relates to the mode of obtaining ornmental surfaces to buttons, which are covered with silk, or other woven fabrics, by means of embossing or stamping, and otherwise preparing the surfaces of silk or other woven fabric employed. And in order to give the best information in my power I will proceed to describe the means pursued by me for carrying out my invention. In the first place, I would state, I can produce the desired impression or ornament on the surface of the buttons, either after they are made, or by properly preparing the circular portions of silk or other woven fabric, which are to be used as the covers of the buttons before they are applied. The process of embossing or stamping ornamental impressions on paper, and also in some cases on silk and other fabrics by suitable dies, is well understood. And my invention does not relate generally to embossing of silk or other woven fabrics, but only to so embossing, and otherwise preparing silk and other woven fabrics, when for covering the surfaces of buttons, or when such fabrics are intended for covering buttons. It will readily be understood, that if embossed silk or other woven fabrics were used for the covering buttons, without some further preparations, that the wear, pressure, and damp to which buttons are subjected, would very quickly efface the elegance of design which may be produced by embossing, and it is desirable that whatever be the cement or other proper preparation which is used in setting and retaining the impression produced by embossing, that it should be as much waterproof as possible, though this is not essential so long as it will retain and cause the silk or other woven fabric to retain the embossed impression which is given thereto. The material I prefer to employ for this purpose is shelac, dissolved in naptha, or spirits of wine, which not only renders the silk, or other fabric, water-proof, but aids the paper or such like material employed, and also the silk capable of retaining the ornamental figure or design produced by pressure in dies. In the first place, I will describe the mode pursued by me, and which I have found fully to answer the purpose for preparing covers for buttons which are to be applied in making covered buttons with flexible or other shanks, and made by dies and pressure as is well understood and was originally invented by Mr. Benjamin Sanders, and is now extensively practised by him and others, as well as by a plan employed by Mr. Aston, of Birmingham, and known as Aston's mode of making covered buttons; or such cover may be sewed, or otherwise fixed, on to proper shapes, and formed into buttons, my invention not relating to the mode of combining the parts into buttons, but only consists in a mode of producing ornamental surfaces to cover buttons by embossing. In pursuing my invention, circular portions of silk, or other woven fabric, are to be cut by the fly-press, or otherwise, as is well understood, of the size proper for covering a given size of buttons. On to the back of each of these portions of silk or other woven fabric is supplied a circular disc of paper, or other proper material, by means of the cement above described; or other cement or material which will effect a like purpose; the circular disc of paper being only of the size of the face or front of the button, and the cement is allowed to dry. The silk, or other woven fabric, so prepared by cement and other material, is then ready to receive an impression by the aid of suitable dies which are made according to the description and size of the button required: and thus supposing a rose, or other flower or other ornamental design, as a centre to the button, were desired, in such case, the rose, or other design, would be sunk in the centre of the die, in like manner to ordinary dies used in making metal buttons with ornamental designs or impressions thereon; and in order to obtain a die in relief more suitable for impressing the prepared silk, or other fabric, as above described, I find it desirable so to jag or roughen the under surface of the punch or upper die, that when a circular piece of button-board (a number of layers of paper combined together) is screwed down into the under die, it will cause the button-board to attach itself to the punch, and become the counter die for pressing the prepared silk or other woven fabric into the sunk or engraved die, which will be found better, and less liable to cut, than when metal counter-dies are employed. When such dies are obtained, the circular portions of prepared silk or other fabric are to be successively embossed, taking care that the ornamental impression is produced as nearly as possible in the centre of the portions of prepared woven fabric. The backs of the impressions so obtained, should be next filled up with a further quantity of cement, such as is above described, by which it will be rendered still less liable to injury from any pressure it may meet with in the ordinary wear buttons are subjected to. These portions of silk or other woven fabrics, prepared and embossed, are now ready to be applied to the covering of buttons by dies and pressure, as is well understood, or by the needle, or other means, taking care in using dies and pressure that the finishing dies are so sunk that the pressure thereof will not injure the centre, or ornamental pattern or design, produced thereon. When I make the button first, by any of the known means, having the outer covering of silk or other woven fabric, in the course of making it, I apply a surface of button-board next the woven fabric, and I prepare such circular disc of button-board by coating it well with cement, such as is herein described, which is to come next to, and in contact with, the woven fabrics; such cement being dried on the surface of the button-board before using. And in making the buttons with dies and pressure, the circular portions of silk or other woven fabrics unprepared, is placed first in the mould, then the surface of prepared button-board, then the other parts of the button as usual, and the parts are to be combined by pressure, as is well understood, after which the button is conveyed to another die, having the ornamental impression which it is desired to have embossed or impressed on the surface, and this die should be heated to such a degree of heat, that the operator can just bear his hand to rest on it, which I find is readily effected, and regulated, by having a small gas-light acting against the die, and the impression is produced by the usual punch pressing the button into the lower die with considerable force, and the heat will aid the process, and cause the cement to adhere to the outer fabric or covering, and will give to it a degree of water-proof and retentive character, which the simple pressure of the die on the woven fabric would not of itself possess; but, on the contrary, an impression, without cementing and other materials, would have little effect.

Having thus described my invention, I would remark that variations may be made in the performing the operations herein described. I do not therefore confine myself to the precise means herein described, so long as the principle of my invention be retained. But what I claim as the invention secured by the present letters patent is the mode herein described of producing ornamental surfaces to buttons covered with silk or other woven fabrics, by means of embossing or impressing, and suitable preparation or cement, and other materials, to retain the ornamental designs produced, as above described.—In witness whereof, &c.

Enrolled January 7, 1839.

Specification of the Patent granted to Moses Poole, *of the Patent Office, Lincoln's Inn, for Improvements in Constructing and Applying Boxes to Wheels.*—Sealed February 28, 1839.

To all to whom these presents shall come, &c. &c., *Now know ye*, that in compliance with the said proviso, I, the said Moses Poole, do hereby declare the nature of the invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say):—

The invention relates to a mode of constructing the axle-tree-boxes of wheels for various descriptions of carriages, whereby the same will, when in their place in the wooden naves of wheels, be more secure from coming or being forced out or deranged.

It is well known that, according to the ordinary construction of axle-tree-boxes, the outer surfaces thereof are formed plain, or they have projections or webs longitudinally, and that such boxes are affixed in the wooden naves of wheels by means of wedges, and, by such modes of construction and application of axle-tree-boxes to carriage-wheels, the same are very liable to be forced out, or to become deranged. Now the object of the invention is to make such axle-tree-boxes with a screw on their external surfaces, in such manner that they will screw into the naves of carriage-wheels, and I either make such boxes with screws, by casting the boxes with screws on their external surfaces, or I produce such screw by cutting with proper tools. The nature of casting axle-tree-boxes being well understood, and as casting of screws for other purposes is well understood, it will not be necessary to enter into a description of such processes further than to remark that, in order to cast axle-tree-boxes with screws on their external surfaces, it will only be necessary to have suitable cores formed with screws for the external surfaces, in place of casting the external surfaces plain, or with longitudinal projections or webs; and further, when the screw is to be cut by tools, then the axle-tree-boxes are to be made of such additional substances as will allow of cutting screws thereon, suitable for screwing into the wood of which the naves of wheels are made. And I would remark, that by the employment of axle-tree-boxes with screws on the external surfaces, as above explained, they will be less liable to derangement than axle-tree-boxes of the ordinary construction.

Having thus described the nature of the invention, I would have it understood that I lay no claim to the processes of making screws, nor to the forming of axle-tree-boxes, when separately considered. Nor do I confine myself to any particular internal construction of axle-tree-boxes, the invention only relating to the external surfaces of axle-tree-boxes. But what I claim is the constructing axle-tree-boxes for wheels of carriages of various descriptions with screws on their external surfaces, as above described.—In witness whereof, &c.

Enrolled August 28, 1839.

Specification of the Patent granted to James Clements, *of Liverpool, Carver and Gilder, for Improvements in Preparing Mouldings, and in Producing the Effect of Chasing or Embossing various Devices and Patterns on Frames, and other Works.*—Sealed April 10, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said James Clements, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say:—)

My invention relates to a mode of preparing mouldings in such manner as to produce the effect of chasing or embossing various devices or patterns, and which mode is equally applicable to producing the effect of chasing or embossing various devices or patterns on frames, or other works; and such modes consist of certain means of obtaining impressions of fabrics made of fibrous materials on the surfaces of mouldings, or of frames, or of other works requiring such ornaments produced thereon, and such fabrics are caused to adhere to the surfaces, whether of mouldings, frames, or other works, and the reticulated or open portions of the fabrics are then filled up with suitable materials, and then the fabric employed is removed, leaving an impression of the closed or solid part of the fabric sunk on the surface, the other parts of the surface, where the open portions of the fabric are situated, being left in relief.

The description of fabrics I have found to answer best are those produced by what are called warp lace-machines, such fabrics being made at very small cost, and in the greatest variety of pattern, and for such reason offer advantages not so readily attainable by other modes of making fabrics by netting lace, making, knitting, and weaving with warp and shuttle. At the same time, suitable open or reticulated fabrics may be made by any of those means proper for performing my invention. And I would state generally, that the proper description of fabrics for working according to my invention, are those which are worked in an open manner, leaving interstices between the threads or yarns of which they are composed.

Having thus described the nature of my invention, I will proceed to explain the process pursued by me for carrying out my improvements. Mouldings, or frames, or other works of wood or other proper material, having been formed by the ordinary means, requiring to have ornamental surfaces, having the effect of chasing or embossing produced thereon, are to be treated in the following manner; and in order to make the process readily understood, I will suppose that it is desired to produce the effect of chasing or embossing on either the mouldings or the plain surfaces, or of both those parts of a picture-frame, and that the fabric to be employed is ornamental or plain lace produced in warp-lace-machines, or in bobbin-net-lace-machines. The surface of the frame is to be coated over with the ordinary preparation, (size and whiting,) used by gilders, and having produced an even, equal, and smooth surface of such preparation, in the same manner as at present practised by carvers and gilders, the same is to be permitted to dry. The lace or other fabric from which the impression is to be taken is then laid evenly on the surfaces so partly prepared, and by means of a soft hair brush and some size and whiting made very fluid, the lace or fabric is caused to adhere evenly and correctly all over those parts of the surface of the frame to which it is desired to give such pattern, and by this means the lace may be caused to follow the plain, or undulating, or regular, as well as irregular, surfaces of the picture-frame, and of the mouldings thereof, and such will evidently be the case if other mouldings or surfaces be treated in like manner, taking care not to distort the pattern of the fabric. The result of this part of the process will be, that the fabric will have the appearance of being, and will in fact be pasted evenly over the surface. When the same has become dry, a coat of the size and whiting, similar to that first employed, and of a substance equal to thick paint, is to be laid on, in order to fill up all the cavities between the threads or yarns of which the fabric employed is made, and then, by means of a smooth and even edge of wood, of the figure of the moulding, or a straight edge where plain surfaces are being operated on, the surfaces are made smooth and equal all over. The surfaces so prepared are allowed to dry, and if all parts are well filled and even, the surface is completed, and the fabric may be removed; but should there appear any inequalities, further quantities of the size and whiting are placed therein. The fabric employed is readily removed by passing a damp sponge over the surface, when the threads or yarns becoming damp, readily part or separate from the size and whiting, leaving an impression on the surface suitable for gilding or otherwise, which will be found a most useful means of so preparing surfaces of mouldings, and of frames, and of other works, as to produce the effect of chasing or embossing of very elegant descriptions, and will be found far superior to any of the ordinary means of working like surfaces.

Having removed the fabric employed, I rub the surface, when dry, with fine sand paper; the surfaces will then be ready to be finished by gilding, painting, or varnishing, or otherwise, according to the object to which the same is to be applied.

Having thus described my improvements, and the best manner I am acquainted with for performing the same, I would remark that although I have spoken of size and whiting as the material employed for preparing the surfaces, in such manner as to produce the effect of embossing or chasing, I have done so because size and whiting are usually employed by gilders and carvers for preparing such surfaces, and I believe such materials to be the best and cheapest for the purpose; but I do not confine myself thereto, as other materials may be used, such as white-lead ocre, as well as other matters, in combination with size, or other suitable adhesive materials. But I would have it understood that my invention does not consist of the materials employed, but in the mode of using them, in order to produce the objects of my invention.—In witness whereof, &c.

Enrolled October 10, 1839.

Specification of the Patent granted to THOMAS ORAM, *of No.* 27, *East Street, Red Lion Square, in the County of Middlesex, Gentleman, for Improvements in the Manufacture of Fuel.*—Sealed March 26, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Oram, do hereby declare that the nature of my said invention and the manner in which the same is to be carried into effect, are fully described and ascertained in and by the following statement thereof, (that is to say) :—

It is well known that in getting coal, much small or dust is produced, which is of comparatively little value. Now the object of my invention is the compounding such dust or small of coal with other matters, in such proportion as to render the compounds of as great, and under some circumstances, greater value than the large of such coal, when the relative quantity of effect obtained therefrom and the convenience of stowage is taken into account; and my invention consists in combining and compressing the small or dust of coal with certain materials into fuel, as will be hereafter described.

The materials employed by me are first, small or dust of bituminous coal,

Secondly, mud, alluvial deposits, marl, clay, and other earth, containing vegetable matter.

Thirdly, water; and there are several other substances which may, under certain circumstances, be employed with the above three, but are not absolutely necessary to make a good fuel, such as mineral-tar, coal-tar, gas-tar, mineral-pitch, vegetable-pitch, resin, asphaltum, or any other bituminous matter, chalk, or lime, saw-dust, anthracite or stone-coal, coke or coke-dust, and breeze. And in order to give the best information in my power for carrying out my invention, I will describe a process of combining and forming these materials into several species of fuel.

Description of the Process employed.

Take 30 lbs. of vegetable-tar, coal-tar, gas-tar, mineral-pitch, vegetable-pitch, resin, asphaltum, or any other bituminous matter, (Note — the vegetable-tar, coal-tar, and gas-tar, will readily mix with the other ingredients used, but if either mineral-pitch, vegetable-pitch, resin, asphaltum, or any other bituminous matter, be employed, it should first be dissolved in boiling water, and whilst hot, mixed with the other materials,) 18 lbs. of dry mud, (the best for the purpose is that taken from rivers), clay, marl, or any other earth containing vegetable matter, and 50 gallons of water, and mix them together; then add, by degrees, 30 lbs. of powdered lime (stone-lime is the best) or chalk passed through a fine sieve, and 1 ton of small or dust of bituminous coal. The whole should then be well stirred up with rakes or other suitable instruments until the several materials are thoroughly combined, or they may be mixed together by machinery, it being necessary to obtain a perfect blending of the materials, in order to their adhering together and burning equally. The materials so combined are then to be put into moulds of any shape, (though it were better that they should be either square, oblong, or angular,) the dimensions of which may be of any size found most convenient, and then pressed, either in a screw, lever, or other press; but I claim the combination as an invention, whether the same be submitted to pressure or not, the object and advantage of pressing, being the holding of the materials together, to increase the period and duration of combustion, and to reduce the bulk as much as practicable. The lumps or blocks thus produced are to be placed to dry, leaving spaces between the lumps for the circulation of the air, and it will facilitate the drying to place them in a room or shed, the atmosphere of which can be heated, though in warm, dry weather this will not be necessary.

I have also to describe another species of fuel which forms a desirable fuel for use in furnaces having a powerful draught. Take 10 cwt. of small or dust of bituminous coal, 10 cwt. of small oven-made coke or coke-dust, (which proportions will admit of variation,) 30 lbs. of tar, or any other of the bituminous matters before specified, 200 lbs. of dry mud, clay, marl, or other earth containing vegetable matter, 50 gallons of water, and 30 lbs. of lime or chalk, and mix, mould, and press them in precisely the same manner as described for manufacturing the first-mentioned fuel.

I have also to describe a third species of fuel. Take 15 cwt. of small or dust of bituminous coal, 5 cwt. of breeze, (which proportions will also admit of variation), 30 lbs. of tar or any other of the bituminous matters before specified, 200 lbs. of dry clay, marl, mud, or other earth containing vegetable matter, 50 gallons of water, and 30 lbs. of lime or chalk, mixed, moulded, and pressed in like manner.

I have also to describe a fourth species of fuel. Take 13 cwt. of the anthracite or stone-coal, 7 cwt. of small, or dust of bituminous coal, (which proportions will admit of considerable variation,) 40 gallons of water, 40lbs. of tar or other bitumen as before, 30 lbs. of lime or chalk, and 180 lbs. of dry clay, mud, marl, or other earths containing vegetable matter, mixed, moulded, and pressed in like manner.

I have also to describe a fifth species of fuel. Take 15 cwt. of small, or dust of bituminous coal, 5 cwt. of saw-dust (which proportions will admit of considerable variation) 40lbs. of tar or other bitumen as before, 200lbs. of dry clay, mud, marl, or other earth, containing vegetable matter: 70 gallons of water (the quantity of water must be varied in proportion as the quantity of saw-dust is used), 30lbs. of lime or chalk, mixed, moulded and pressed in like manner.

I have also to describe a sixth species of fuel. Take 5 cwt. of peat-turf, peat-earth, peat-moss, or bogearth: 5 cwt. of saw-dust; 10 cwt. of small, or dust of bituminous-coal; 30lbs. of lime, or chalk; 30lbs. of tar, or other bitumen as before; 200lbs. of dry clay, mud, marl, or other earth containing vegetable matter, and 70 gallons of water, mixed, moulded and pressed in like manner.

I would observe, that in manufacturing each of the above species of fuel, the ingredients "lime" and "bitumen" may be omitted, but I find that the use of them not only increases the adhesion of the other materials, but the lime has the effect of neutralizing the sulphurous acid-gas contained in the coal, and the bitumen adds to the ready combustion of the fuel. And further, that, I prefer the use of vegetable-tar to any other bitumen of mud, (especially river mud, and more particularly such as is taken from the River Thames) to any other earth,—of stone-lime, to chalk or any other description of lime; and the saw-dust from the pine, to the saw-dust of any other description of timber.

Having thus described the nature of my invention, and the process of manufacture, I would remark, that I do not confine myself to any particular process, it being evident that the object to be obtained is a careful combining or mixing of the materials herein mentioned, and the subsequent pressing the same into lumps or blocks of convenient size, and of the forms most advantageous for packing or stowage, and whatever process may be adopted, it does not alter the nature of my invention. And I would further observe, that I do not claim the application of each of the several materials separately, as a fuel, whether pressed or unpressed, as I am aware that some of them have been used as a fuel before, such as anthracite or stone, coal, coke, breeze, peat-earth, peat-turf, peat-moss or bog-earth; small coal or coal-dust; and small coal or coal-dust in combination with mud, marl, or clay in certain proportions. But what I claim is, the combining small or dust of bituminous coal with marl, clay, mud, alluvial deposits, or other earth containing vegetable matter, and with water in all cases where the weight or quantity of small coal or coal dust is equal to, or exceeds the weight or quantity of mud, clay, or other earth used, whether the same has or has not any one or more of the other matters herein mentioned. And further I claim the compressing of small coal, or coal-dust in combination with any of the above mentioned matters, into angular blocks or shapes suitable for better stowage, but I do not claim as new, the application of tar, pitch or other bitumen in combination with coal, or with any other of the matters, various attempts having been before made for employing them as fuel; nor do I confine myself to the using the whole, or even the larger number of the several matters before enumerated for the formation of the several descriptions of fuel above mentioned, though I believe the compounds herein severally set forth, to be the best compound for fuel.—In witness whereof, &c.

Enrolled September 26, 1838.

SELECTED PAPERS.

Ornaments for Mouldings, &c. By Mr. J. Esquilant.

The ornaments are flowers, foilage, and fruit, arranged in wreaths or groups, and copied from nature with sufficient accuracy to be at once recognizable. They are entirely relieved from the plain surface on which they are placed, resembling in their general appearance the highly raised carvings in wood by Gibbons and other artists of the last century.

Metal moulds of separate leaves, and of the various petals and other pieces of which flowers are composed, are to be prepared. A piece of leather, of the required thickness, is to be cut to the proper form and size of the intended leaf, and is then to be soaked for a day or two in a solution of rosin in common oil of turpentine. When the leather is fully impregnated with the liquor, it is to be taken out and wiped, and then cold-pressed in the mould with sufficient force to give it the intended figure: it hardens as it dries by the evaporation of the essential oil, and, when once dry, retains its form without warping afterwards on exposure to damp or draught. The separate pieces are then put together by ties and glue, and finally are covered with a coat of paint, varnish, or gilding. For representing fruits, he employs sawdust ground in a mill to fine powder, and mixed up to the consistence of putty with glue and a little rosin and turpentine. This composition may be moulded either by hand, or by pressure into moulds: when dry, it has the appearance, and more than the hardness, of wood. For flowers with thin petals, such as roses and carnations, he often uses rolled zinc, shaped to the proper figure by compressing the parts separately in a mould, and then cementing them together. Leather, prepared as above described, has the following advantages over wood or *papier-maché:* with a degree of hardness at least equal to either of these substances, it is so tough as not to be liable to chip by a blow, and may therefore be made to stand out from the surface to which it is applied in the highest relief, without the risk of damage; and the cost, all things being considered, is very moderate.*

Experimental Researches upon the Cost of the Light afforded by different Lamps and Candles. By Andrew Ure, M.D., F.R.S., &c. &c.

The author having instituted a series of experiments to determine the advantages of Mr. Parker's new hot oil lamp, adopts as the standard of comparison the French mechanical lamp, in which the oil is raised by machinery, so as continually to overflow at the bottom of the burning wick. The relative illumination was determined by the well-known method of the equal intensity of shadows, and verified by that adopted by Professor Wheatstone, namely, by the relative brightness of the opposite sides of a revolving ball.

One peculiar feature of the new lamp is its bell-mouthed glass chimney, above which is a chimney of iron, with a parted diaphragm for the purpose of causing a certain portion of the heat of the flame to reverberate against the interior cylindric cavity of the oil-cistern. The bell-mouth is formed in a mould, and is far better suited for producing a steady flame than the rectangularly contracted chimney of the mechanical lamp. The intensity of the shadows from the mechanical-lamp and the hot-oil-lamp, of a wire a few inches long, and of the thickness of a crow quil, was equal, at the distance of 10 and 11 feet respectively; their relative illuminations being as the squares of these are, as 100 and 121 respectively, and the consumption of the best sperm oil was 15·2 and 11·6 grains per minute; the relative cost of illumination for this oil would thus appear to be 50 per cent. in favour of the new lamp. On trying southern whale-oil the cost of illumination appeared to be about one-third that of the mechanical, and one-half that of the hot-oil-lamp with sperm-oil. The author tried many other substances, and, comparing the various illuminations, concludes that the hot-oil-lamp with southern whale-oil affords an economy of light nearly 12 times greater than stearine or German wax-candles, $7\frac{1}{2}$ times greater than tallow-mould, 11 times greater than cocoa-nut, $8\frac{1}{2}$ times greater than Palmer's, $17\frac{1}{2}$ times greater than spermaceti, and 18 times greater than wax-candles.

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* From the Transactions of the Society of Arts, &c.

The author had also compared the illumination produced by one of the Fresnel's Lamps deposited at the Trinity House. The lamp consists of four concentric circular wicks, placed in a horizontal plane, the innermost being $\frac{7}{8}$ths of an inch, and the outermost $3\frac{1}{2}$ inches in diameter. The intensity of the shadows from this and from the mechanical-lamp were equal at a distance of 13 feet 3 inches, and 4 feet 6 inches respectively; taking the squares of these the Fresnel lamp gives about nine times the light of the mechanical, which latter may be assumed as equal to that of 11 average wax-candles. On comparing one of the best Argand lamps with the mechanical, the former was to the latter as 10 to 11; so that the illumination of the Fresnel lamp, instead of being as has been asserted equal to 40 Argand lamps, is not equal to more than 9·6 of those lamps. In the Bude light a small stream of oxygen is sent up through a small tube within the burning wick, which is $\frac{5}{8}$ths of an inch in diameter, and the flame about $\frac{3}{8}$ths of an inch. The illuminating power is equal to about 30 wax-candles. Dr. Ure also examined the illuminating power of different kinds of wax-candles, and found that the light from a long-three and a short-three was the same, or $\frac{1}{11}$th of that of the mechanical-lamp; also the light emitted from one of the six-to-the-pound was very little less, being $\frac{1}{12}$th of that of the mechanical-lamp. The consumption of wax in a long or short-three may be taken at 126 grains per hour, and in a short-six at 125 grains per hour.

Wax contains 81·75 parts of carbon in every 100 parts, and the combustion of these 100 parts produces 35 parts of carbonic-acid, consequently a wax-candle will generate per hour about 375 grains of carbonic-acid, or 800 cubic inches of gas. Now an average sized man developes and exhales from his lungs 1632 cubic inches of gas per hour; thus the combustion of two ordinary wax-lights deteriorates the air to about the same extent as the breathing of one man.

NOTICE OF EXPIRED PATENTS.

(*Continued from p.* 181.)

Jean Francois Gravier, of Canon Street, London, Merchant, for a certain method or methods of regulating the emission or flow of gas from portable reservoirs, and of increasing the safety or security of such reservoirs. Communicated to him by a certain foreigner residing abroad.—Sealed May 14, 1825.

Thomas Pyke, of Broadway, near Ilminster, Somersetshire, Dissenting Minister, for a machine or apparatus to prevent the overturning or falling of carriages.—Sealed May 14, 1825.

Alexander Galloway, of West Street, London, Engineer, for a machine or machines for the forming and moulding of bricks and other bodies usually made from clay, plastic, or any of the usual materials from which building and fire-bricks are commonly made.—Sealed May 14, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 129.)

William Grimble, of Cow Cross Street, Middlesex, Gentleman, for certain improvements in the construction of apparatus for distilling spirituous liquors.—Sealed May 14, 1825.

Edward Garsed, of Leeds, Yorkshire, Flax Spinner, for certain improvements in a machine or machinery for hacking, combing, or dressing, flax, hemp, and other fibrous materials.—Sealed May 14, 1825.

Henry Oswald Weatherley, of Queen Anne Street, Saint Mary-le-bone, Middlesex, for certain apparatus or machinery for the purpose of splitting, rending asunder, cutting, or cleaving of wood, and forming and securing the same in bundles.—Sealed May 14, 1825.

Goldsworthy Gurney, of Argyle Street, Hanover Square, Middlesex, Surgeon, for an apparatus for propelling carriages on common roads or on railways.—Sealed May 14, 1825.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 426.)

John Young, of Wolverhampton, Cooper, for certain improvements in the construction of locks for doors, and other purposes.—Sealed May 14, 1825.

James Fox, of Plymouth, Devonshire, Rectifying Distiller, for an improved safe to be used in the distillation of ardent spirits.—Sealed May 14, 1825.

Charles Macintosh, of Crossbasket, Scotland, Esquire, for a new process for making steel.—Sealed May 14, 1825.

John Badams, of Ashted, near Birmingham, Warwickshire, Chemist, for a new method of extracting certain metals from their ores, and purifying certain metals.—Sealed May 16, 1825.

Isaac Reviere, of 315, Oxford Street, Middlesex, Gun Maker, for an improved construction, arrangement, and simplification of the machinery by which guns, pistols, and other fire-arms are discharged.—Sealed May 20, 1825.

William Henry James of Coburg Place, Winson Green, near Birmingham, Engineer, for certain improvements in apparatus for diving under water, and which apparatus, or parts of which apparatus, are also applicable to other purposes.—Sealed May 31, 1825. (*For account of specification, see Repertory, Vol.* 2, *third series, p.* 195.

John Harvey Sadler, of Hoxton, Middlesex, Machinist, for an improved power-loom for the weaving of silk, cotton, linen, wool, flax, and hemp, and mixtures thereof.—Sealed May 31, 1825.

Joseph Frederick Ledsam, Merchant and **Benjamin Cook**, Brass Founder, both of Birmingham, for improvements in the production and purification of coal-gas.—Sealed May 31, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 135.

PATENTS GRANTED FOR SCOTLAND,

(*From June* 25, *to October* 22, 1839).

Richard Beard, of Egremont Place, New Road, in the county of Middlesex, Gentleman, for improvements in printing calicoes and other fabrics. Communicated by a foreigner residing abroad.—Sealed June 25, 1839.

John Small, of Old Jewry, in the city of London, Merchant, for improvements in the manufacture of thread, or yarn, and paper, by the application of certain fibrous materials not hitherto so employed. Communicated by a foreigner residing abroad.—Sealed June 26, 1839.

James Lees, of Salem, near Oldham, in the county of Lancaster, Cotton Spinner, for an improvement in the machinery for spinning, twisting, and doubling cotton, silk, wool, hemp, flax, and other fibrous materials.—Sealed July 2, 1839.

John Arrowsmith, of Bilston, in the county of Stafford, Civil Engineer, for certain improvements in steam-engines.—Sealed July 3, 1839.

Frank Hills, of Deptford, in the county of Kent, Manufacturing Chemist, for certain improvements in the construction of steam-boilers and locomotive-engines. Sealed July 3, 1839.

Thomas Clark, and **Charles Clark**, of Wolverhampton, in the county of Stafford, Iron Founders and copartners, for glazing and enamelling cast-iron, holloware, and other metallic substances.—Sealed July 4, 1839.

Alexander Gordon, of Fludyer Street, Westminster, in the county of Middlesex, Engineer, for a new machine or appartus for employing or using steam or other elastic fluid as a motive power. Communicated by a foreigner residing abroad.—Sealed July 5, 1839.

James Kay, formerly of Preston in the county of Lancaster, Cotton-spinner, but now of Pendleton, near Manchester, in the aforesaid county, Flax-spinner, of an extension of three years, from June 23, 1839, of a patent granted to him for a new and improved machinery for preparing and spinning flax, hemp, and other fibrous substances, by power.—Sealed July 11, 1839.

Abraham Bury, of Manchester, in the county of Lancaster, Gentleman, for certain improvements in the mode of printing, colouring, or dyeing cotton or other fabrics.—Sealed July 12, 1839.

Joseph Maudslay and **Joshua Field**, of the firm of Maudslay, Sons, and Field, Engineers, of Lambeth, in the county of Surrey, for improvements in the construction of marine steam-engines, which are particularly applibable to steam-engines of the largest class.—Sealed July 15, 1839.

Charles Sanderson, of Sheffield, in the county of York, Steel Manufacturer, for a certain improvement in the art or process of smelting iron ores.—Sealed July 15, 1839.

James Templeton, Manufacturer, in Paisley, and als **William Quiglay**, Weaver, in Paisley, for machinery for a new and improved mode of manufacturing silk, cotton, woollen, and linen fabrics.—Sealed July 17, 1839.

Pierre Auguste Ducote, of No. 70, St. Martin's Lane, in the county of Middlesex, for certain improvements in the art of printing on paper, calicos, silks, and other fabrics.—Sealed July 17, 1839.

John Thomas Betts, of Smithfield Bars, in the city of London, Rectifier, for improvements in the process of preparing spirituous liquors in the making of brandy. Communicated by a foreigner residing abroad.—Sealed July 19, 1839.

David Johnston, of Glasgow, Manufacturer, for certain improvements in the manufacture of hinges. Communicated by a foreigner residing abroad.—Sealed July 19, 1839.

Moses Poole, of the Patent Office, Lincoln's Inn, in the county of Middlesex, Gentleman, for improvements in printing calicos and other fabrics. Communicated by a foreigner residing abroad.—Sealed July 19, 1839.

John Fairrie, of Church Lane, Whitechapel, in the county of Middlesex, Sugar Refiner, for improvements in making and refining sugar.—Sealed July 19, 1839.

Henrich Zander, of North Street, Sloane Street, in the county of Middlesex, Gentleman, for improvements in steam-engines, steam-boilers, and condensers.—Sealed July 22, 1839.

John Evans, of Birmingham, in the county of Warwick, Paper Manufacturer, for improvements in the manufacture of paper.—Sealed July 23, 1839.

John Alexander Elzear Degrand, of the Boulevard du Temple, in the city of Paris, but now of Covent Garden, in the county of Middlesex, for improvements in the production of motive power, and in machinery for applying the same to useful purposes.—Sealed July 23, 1839.

Edward Francois Joseph Duclos, late of Samson, in the kingdom of Belgium, but now of Leicester Place, Leicester Square, in the county of Middlesex, Gentleman, for improvements in the manufacture of zinc, copper, tin, and antimony.—Sealed July 23, 1839.

Charles de Laveleye, of King's Head Court, Shoe Lane, in the city of London, Engineer, for improvements in the manufacture of bricks. Communicated by a foreigner residing abroad.—Sealed July 23, 1839.

Theodore Cotelle, of the Haymarket, in the county of Middlesex, Civil Engineer, for improvements in extracting salt from sea or salt water, and rendering it pure and drinkable, and in purifying other waters.—Sealed July 23, 1839.

William Newton, of the Office for Patents, 66, Chancery Lane, in the county of Middlesex, Civil Engineer, for an invention of certain improvements in engines to be worked by air or other gases. Communicated by a foreigner residing abroad.— Sealed July 31, 1839.

Robert Griffiths, of Smethwick, in the county of Stafford, for certain improvements in the construction of presses, which improvements are also applicable to the raising of weights.—Sealed August 1, 1839.

Joseph Jennings, of Bisson Bridge, in the parish of Ker, in the county of Cornwall, Assay Master, for a process for obtaining metal from pyrites or mundic.—Sealed August 1, 1839.

Christopher Binks, residing in Middlebie Street, Newington, near Edinburgh, for certain improvements in obtaining or manufacturing chlorine, and certain compounds of chlorine, applicable in bleaching.—Sealed August 2, 1839.

David Stead, of Great Winchester Street, in the city of London, Merchant, for an improved mode or method of making or paving public streets and highways, and public and private roads, baths, courts, and bridges, with timber, or wooden blocks. Partly communicated by a foreigner residing abroad.—Sealed August 6, 1839.

John George Shuttleworth, of the Mount, near Sheffield, in the county of York, Soap Boiler, for a new mode of obtaining a rotary motion from the rectilinear motion of the piston rod, in a steam or other the like engine.—Sealed August 8, 1839.

George Holworthy Palmer, of Surrey Square, Old Kent Koad, in the county of Surrey, Civil Engineer, for certain improvements in paddle-wheels for propelling ships, boats, or other vessels, navigated by steam or other motive power.—Sealed August 16, 1839.

John Rostron, of Edenfield, in the county of Lancaster, Cotton-Spinner, for certain improvements in looms for weaving. Communicated by a foreigner residing abroad.—Sealed August 16, 1839.

William Henry Hornby, of Blackburn, in the county of Lancaster, Cotton-Spinner, and William Kenworthy, of the same place, Cotton-Spinner, for certain improvements in the machinery or apparatus for sizing and otherwise preparing cotton, wool, flax, and other warps for weaving.—Sealed August 17, 1839.

John Mercier, of Oakenshaw, in the county of Lancaster, Calico-Printer and Chemist, John Dynelay Prince, the younger, of Manchester, in the said county, Calico-Printer, and William Blythe, of Church, in the said county, Manufacturing Chemist, for certain improved processes to be used in the printing, dyeing, or colouring of cotton, woollen, silk, or other cloths and yarns. —Sealed August 17, 1839.

John Buchanan, of Glasgow, North Britain, Coachbuilder, and William Bridges Adams, of Porchester Terrace, Bayswater, in the county of Middlesex, Gentleman, for certain improvements in the construction of wheel-carriages, parts of which improvements are also applicable to machinery for propelling and also for the purpose of securing ships and other vessels, and for communicating motion between different portions of machinery. —Sealed August 22, 1839.

James Capple Miller, of Manchester, in the county of Lancaster, Gentleman, for improvements in printing calicos, muslins, and other fabrics.—August 26, 1839.

Barclay Farquharson Watson, of Lincoln's Inn Fields, in the county of Middlesex, Solicitor, for improvements in crushing or preparing New Zealand flax (Phornium Tenax). Communicated by a foreigner residing abroad.—Sealed September 4, 1839.

Matthew Uzielli, of King William Street, in the city of London, Merchant, for improvements in impregnating wood or timber with chemical materials. Communicated by a foreigner residing abroad.—Sealed September 4, 1839.

John Augustus Tulk, of Seaton and Lowca Ironworks, Cumberland, Iron Master, for improvements in the manufacture of iron.—Sealed September 4, 1839.

Frederick Parker, of New Gravel Lane, Shadwell, in the county of Middlesex, Animal Charcoal Manufacturer, for improvements in revivifying or restoring animal charcoal.—Sealed September 6, 1839.

John Dickson, of Brook Street, Holborn, in the city of London, Engineer, for improvements in rotatory steam-engines.—Sealed September 6, 1839,

William Hale, of Greenwich, in the county of Kent, Engineer, for improvements in steam-engines, and apparatus connected therewith, and in machinery for propelling vessels, part of which improvements are applicable to raising or forcing fluids.—Sealed September 7, 1839.

Robert Carey, of Breadgar, near Sittingbourne, in the county of Kent, Gentleman, for certain improvements in paving or covering streets, roads, and other ways. Communicated by a foreigner residing abroad.—Sealed September 17, 1839.

Peter Lennox, of Bolton-le-Moors, in the county of Lancaster, Weaver, for certain improvements in looms for weaving.—Sealed October 9, 1839.

Joseph Garnett, of Haslingden, in the county of Lancaster, Dyer, for certain improvements in machinery or apparatus for carding, drawing, roving, and spinning cotton, flax, wool, and other fibrous materials. Communicated by a foreigner residing abroad.—Sealed October 9, 1839.

Joseph Davies, of Nelson Square, in the county of Surrey, Gentleman, for a composition for protecting wood from flame.—Sealed October 9, 1839.

William Edmondson and James Edmondson, both of Manchester, in the county of Lancaster, Engineers, for certain improvements in the machinery or apparatus for the manufacture of wood-screws, and screw-bolts.—Sealed October 19, 1839.

Wilkinson Steele and Patrick Sanderson Steele, Manufacturing and Furnishing Ironmongers, George Street, Edinburgh, for improvements in kitchen ranges for culinary purposes, and apparatus for raising the temperature of water for baths and other uses. — Sealed October 18, 1839.

Robert Stewart, of North Woodside, near Glasgow, Iron Smith, for an improved crane for raising stones or other heavy substances from quarries or other works.—Sealed October, 22, 1839.

Samuel Hall, of Basford, in the county of Nottingham, Engineer, for improvements in steam-engines, and in propelling.—Sealed October 22, 1839.

LIST OF NEW PATENTS.

Joseph Clinton Robertson, of Peterborough Court, Fleet Street, for an improved method of manufacturing artificial marble. Communicated by a foreigner residing abroad.—Sealed September 27, 1839.—(*Six months.*)

Henry James Pidding, of Osnaburgh Street, Middlesex, Artist, for improvements in collars for horses and other animals. Communicated by a foreigner residing abroad.—Sealed September 27, 1839.—(*Six months.*)

Francis Maceroni, of Saint James's Square, Middlesex, Gentleman, for improvements in steam-boilers or generators.—Sealed September 27, 1839.—(*Six months.*)

Thomas Robinson Williams, of Cheapside, Gentleman, for certain improvements in the manufacture of flexible fibrous substances or compositions, applicable to covering buildings and other useful purposes, and also the machinery used therein.—Sealed September 28, 1839.—(*Six months.*)

William Henry Burke, of Shoreditch, for improvements in the mode of constructing vessels for containing air, applicable to the purpose of raising sunken, or lifting floating, bodies under or in water, and of fastening such vessels to chains, or other machinery or apparatus, to be used for raising or lifting such bodies.—Sealed October 3, 1839.—(*Six months.*)

Job Cutler, of Lady Pool Lane, Sparbrook, Warwick, for certain improved combination of metals to be used for various purposes.—Sealed October 3, 1839.—(*Six months.*)

Samuel Hall, of Basford, Nottingham, Engineer, for improvements in machinery for propelling.—Sealed October 7, 1839.—(*Six months.*)

Francis Gybbon Spilsbury, of Walsall, Staffordshire, Chemist, **Marie Francois Catherine Doetzer Corbaux**, of Upper Norton Street, Middlesex, and **Alexander Samuel Byrne**, of Montague Square, Gentleman, for improvements in paints, or pigments and vehicles, and in modes of applying paints, pigments, and vehicles.—Sealed October 3, 1839.—(*Six months.*)

JOHN LOTHIAN, of Edinburgh, Geographer, for improvements in apparatus for measuring or ascertaining weights, strains, or pressure.—Sealed October 10, 1839.—(*Six months.*)

JOHN BARNETT HUMPHREYS, of Southampton, Civil Engineer, for certain improvements in shipping generally, and in steam-vessels in particular, some of these improvements being individually novel, and some the result of novel application or combination of parts already known.—Sealed October 10, 1839.—(*Six months.*)

JAMES SMITH, of Deanston Works, Kilmadock, Perth, Cotton Spinner, for a self-acting temple, applicable to looms for working fabrics, whether moved by hand or power.—Sealed October 10, 1339.—(*Six months.*)

JAMES SMITH, of Deanston Works, Perth, Cotton Spinner, for certain improvements applicable to canal navigation.—Sealed October 10, 1839.—(*Six months.*)

JOHN SWAIN WORTH, of Manchester, Merchant, for improvements in rotatory engines, to be worked by steam and other fluids, such engines being also applicable for pumping water and other liquids.—Sealed October 10, 1839.—(*Six months.*)

DAVID HARCOURT, of Birmingham, Brass Founder, for certain improvements in castors for furniture and other purposes.—Sealed October 10, 1839.—(*Six months.*)

ROBERT EDMUND MORRICE, of King William Street, London, Gentleman, for improvements in the manufacture of boots and shoes, and coverings for the legs. Communicated by a foreigner residing abroad.—Sealed October 17, 1839.—(*Six months.*)

JOHN DICKINSON, of Bedford Row, Holborn, Middlesex, Esquire, for certain improvements in the manufacture of paper.—Sealed October 17, 1839.—(*Six months.*)

JOHN COOPE HADDAN, of Bazing Place, Waterloo Road, Civil Engineer, and GEORGE HAWKS, of Gateshead

Iron Works, Durham, for certain improvements in the construction of wheels for carriages to be used on railways.—Sealed October 17, 1839.—(*Six months.*)

James Yates, of the Effingham Works, Rotherham, Iron Founder, for certain improvements in the construction of furnaces.—Sealed October 19, 1839.—(*Six months.*)

Charles Rober, of Leadenhall Street, Cloth Manufacturer, for improvements in fixing colour in cloth.—Sealed October 19, 1839.—(*Two months.*)

William Newton, of Chancery Lane, Civil Engineer, for certain improvements in machinery or apparatus for working or manufacturing screws. Communicated by a foreigner residing abroad.—Sealed October 24, 1839.—(*Six months.*)

James Sutcliffe, of Henry Street, Limerick, Builder, for certain improvements in machinery or apparatus for raising and forcing water, or other fluids, and increasing the power of water upon water-wheels, and other machinery.—Sealed October 24, 1839.—(*Six months.*)

George Graydon, of Sloane Street, Chelsea, for certain improvements in instruments for which letters patent were formerly granted to him, and which were called therein, A new compass for navigation, and other purposes; parts of which improvements are applicable to instruments for measuring angles at sea or on shore, by aid of reflection or refraction, or of reflection combined with refraction, and part are applicable to magnetic compasses, for ascertaining true bearings from celestial observations, and for comparing the same with the bearing of the magnetic needle contained in such compasses, whereby to determine and to be enabled to allow for the deviation of such needle from the true meridian, whether by variation, local attraction, or other cause of error.—Sealed October 24, 1839.—(*Six months.*)

V Vol XII New Series

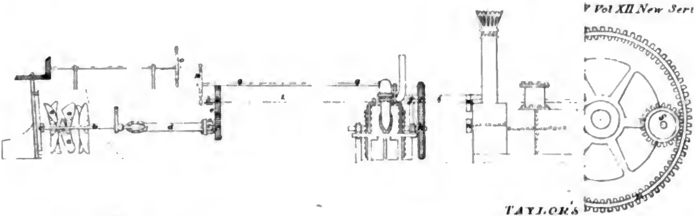

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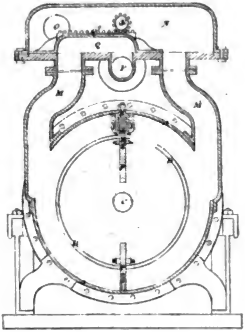
Fig 6



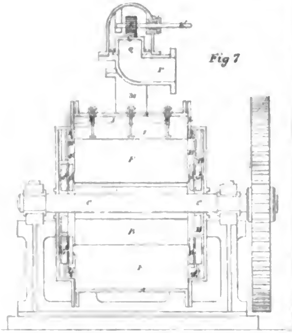


Fig 7

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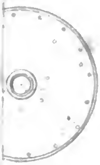


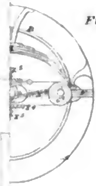


Fig 8

Fig 12

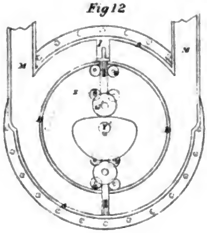


Fig 13

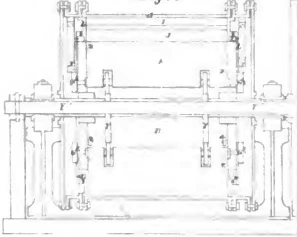
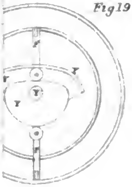
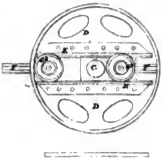
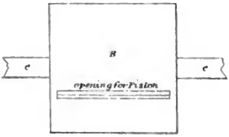
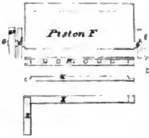


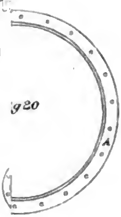
Fig 19











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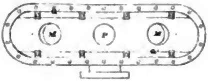
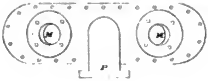


View of underside of Steam Box N.



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PATENT INVENTIONS.

No. LXXII. NEW SERIES.—DECEMBER, 1839.

Specification of the Patent granted to Peter Taylor, *of Birchen Bower within Chadderton, in the County of Lancaster, Rope Maker and Slate Merchant, for Improvements in Machinery for Propelling Vessels, Carriages, and Machinery, parts of which Improvements are applicable to the Raising of Water.*— Sealed December 1, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.— *Now know ye*, that in compliance with the said proviso, I, the said Peter Taylor, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):—

My invention relates, first, to certain combinations of machinery or apparatus for propelling vessels.

Secondly, to improvements in rotatory steam-engines, which are suitable for driving such machinery for propelling vessels, and also for propelling the wheels of locomotive engines, and generally to actuating machinery; and,

Thirdly, the improvements in rotatory steam-engines are equally applicable to rotatory pumps for raising water. And in order that my invention may be most fully understood and readily carried into effect, I will proceed to describe the drawings hereunto annexed.

Description of the Drawings.

Fig. 1, represents a side-view of a canal-boat, barge, or vessel having my improvements applied thereto, the red lines indicating the general outlines of the barge, and also the additional framing applied to the stem and stern, in order to receive the machinery or apparatus for propelling the same. The blue line indicates the water-line; and I would remark, that the steam-engine, shewn as the means of actuating the machinery or apparatus on board, is of a construction according to the second part of my invention; but it will be evident, that the machinery for propelling is independent of such steam-engine, and may be used with any other good steam-engine. The machinery or apparatus for propelling relates to a mode of using continuous vanes or screws, or portions of screws, or portions of oblique or curved vanes, or blades, on two axes; and the drawing shews a suitable arrangement of axes, both at the stem and stern of the vessel for receiving the proper propellers, according to my invention; at the same time I would remark, that it is not necessary at all times so to arrange such propelling machinery, for it may be applied to either end of the vessel only, or in other convenient position, so long as the mode of combination constituting my invention is retained.

Fig. 2, shews a boss and two oblique curved vanes, or portions of screws, or blades, separately, on a larger scale, by which the nature of my propellers will readily be understood; they consist, each, of an oblique vane, or projecting surface, or curved blade, affixed on an axis, fig. 2, shewing two such oblique vanes, or curved blades, affixed to the same boss; and,

Fig. 3, shews a boss separate. These bosses are to be keyed, or otherwise firmly affixed to the axes, and each axis may have one or more such bosses depending on the power of the engine, and on the extent of surface of such vanes or blades. I would here remark, that I am aware that similar vanes, or portions of screws, as well as entire screws, have been before employed for propelling vessels; my invention does not, therefore, relate to the application of such vanes or screws generally, but only to a novel combination of such propellers, which consists in having two shafts or axes so arranged in respect to each other, that the screws, or portions of screws, or curved vanes, or oblique surfaces or blades of the one, can enter between the screws, or portions of screws, or vanes, or blades, on the other shaft or axis, and thus enable me to obtain a very considerable extent of propelling surface within a given space.

Fig. 4, shews an end view of the barge or vessel, wherein it will be seen that the portions of screws, or oblique vanes, or curved propellers of one shaft or axes come nearly up to the other shaft or axis, thereby obtaining a great extent of propelling surface within the space of the stern of such vessel; and I would remark, that although the axes are shewn as above the water-line, it is not essential to the well-working of my improvement of this mode of propelling, for the axes or shaft smay be below the water-line, and, indeed, the whole of the propeller's surfaces may be below the water-line; and although I have described the working of the vanes or screws, one between the other, yet I would have it understood that I do not confine myself thereto, when the shafts are kept above the water-line, as the shafts may be put to a greater distance apart (when using portions of screws or vanes) and relatively placed, though even the vessel should intervene, so as not to permit the vanes to work between each

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other; but I am of opinion that such placing will not be found so useful as the arrangement above described; and I wish it to be distinctly understood, that in all cases when using entire screws, I do not confine myself to the working of them as between each other, whether above or below the water-line. In the drawing *a*, *a*, represent the oblique vanes, or portions of screws, or curved blades affixed on the shafts or axis, *b*, *b*, and they are set or affixed on the shafts or axes in opposite directions; that is, the oblique vanes or propellers, *a*, *a*, are affixed on one shaft or axis in such manner that they may be said to form parts of a right-handed screw; and the oblique vanes or propellers, *a*, *a*, are so affixed on the other shaft or axis, that they may be said to form parts of a left-handed screw; and when using entire screws, they must also be right hand and left hand, and the shafts are placed so near together, that the vanes, *a*, *a*, work nearly up to the shaft on which they are not placed, as will readily be understood on examining the drawing; and this is invariably the case when using entire screws, or continuous vanes. The shafts, *b*, turn in suitable bearings at *c*, *c*, and they pass through tubes, *d*, and enter a well or enclosure of the vessel, as is shewn at *e*, from which no water can flow into the vessel; and having cog-wheels, *f*, affixed, as shewn at *g*, these wheels receive motion from other cog-wheels, *h*, affixed on the axis, *i*, which turns in suitable bearing at *j*; this axis, *i*, receives motion from the cog-wheel, *k*, affixed on the main shaft or axis of the rotatory steam-engine, the nature of which will be hereafter described; such wheel, *k*, taking into and driving the pinion, *l*, affixed on the axis, *i*, all which is clearly shewn in the drawing, and will readily be understood on examining fig. 1. *m*, is a drum or pulley affixed on the axis, *i*, which, by means of a band or strap, drives the axis, *n*, on which is affixed a fan-wheel, which is applied to produce a quick draft to the boiler, which is of a similar construction to what are now commonly used in locomotive-engines; *o*, is the steering-wheel connected with the rudder by suitable gearing, as shewn; and *p*, is a wheel on the axis, *q*, for reversing the engine when required, as will be hereafter explained, in reference to my improvements on steam-engines; by this arrangement, the steersman can, when it is desirable, reverse the direction of the steam-engine, and by such means have the power of controlling the progress and direction of the barge or vessel, according to his desire.

Fig. 5, shews another arrangement of gearing for propelling two shafts with propellers. *r*, is a cog-wheel, which is affixed to the axis of a rotatory or other steam-engine, and *s, s*, are two cog-wheels or pinions, which are affixed to the shafts carrying the propellers, and it will be seen that the wheel, *r*, has two sets of cogs, and that the wheels, *s*, have like number of teeth to each other, consequently will be driven at like speed: this arrangement offers considerable advantage, where space is an object, and a saving of gearing will be obtained in communicating quick motion to the propellers, by which arrangement also the propellers are driven in contrary directions; by merely reversing the engine, it will be seen that the vessel may be propelled backwards or forwards. It will further be seen, that by exchanging the axes and propellers into the contrary bearings, the water will be moved to or from the centre, as may be most desirable; but in that case the engine or moving power must be reversed. I will now proceed to describe the second part of my invention.

Fig. 6, is a vertical section of a steam-engine constructed according to my invention, the section being taken transversely across the main axis or shaft.

Fig. 7, is another section of the same engine taken lengthwise of the shaft or axis; and,

Fig. 8, is an end view of the engine. In each of these figures the same letters indicate similar parts, and such is the case in respect to the various other figures shewn in the drawing, wherein many of the parts are shewn separately, and in various views. The nature of this engine is such, that there is an external or fixed cylinder, which may be called the steam-cylinder, within which works another cylinder, leaving between the two cylinders an annular space, in which the pistons work, such pistons sliding into and from the inner cylinder. I would remark, that so far there is no novelty in the construction of my engine over others previously constructed. A, is the outer cylinder, which is securely held by suitable framing. B, is the inner cylinder, which may be made in one, or in two, or more parts securely affixed to the main axis, C, by keys, or otherwise. D, D, are the ends of the cylinder, B; and they are so formed as to receive the parallel guides, E, E, as is shewn in the drawing; these guides are affixed by screws and nuts to the ends, D, of the cylinder, B, and the guides are accurately made, in order to their controlling the movement of the pistons, as hereafter explained, and to compel them to move in correct radial lines from and to the centre of the cylinder, B, as they are caused to move by means of the eccentric guides, hereafter explained. F, F, are the pistons, there being two, though other numbers may be used; proper variations of the parts, on the principles hereafter explained, being made, my invention not relating to the number of pistons employed, but to the apparatus used for controlling and aiding their well working. These pistons slide into, and project from, the cylinder, B, as hereafter explained. On the pistons, are projecting axes, G, which have each two wheels or pulleys moving thereon, one of these wheels, G^1, working in the guides, E, E, at each end of the cylinder, B, and, consequently, constraining the piston to move correctly; and I would remark, that it is important that these parts should be truly and accurately made, in order to their working well together. The pistons work through slits or openings formed in the cylinder, B, which are packed by metallic packing, as shewn in the drawing. The pistons are caused to move into, and from, the cylinder, B, by means of eccentric guides, H, H, affixed to, or formed on, the end covers of the cylinder, A; and it is important here to remark, that the guides, H, H, are so applied that the pistons should not be withdrawn out of action till they have passed the eduction-way, and, consequently, are no longer acted or pressed on by the steam, and, therefore, allow of the piston being drawn in towards the centre of the cylinder, B, with ease; and such drawing in of the pistons, and moving of them out, is performed by the wheels, G^{2}, moving between the guides, H, H; and further, the pistons are projected into the annular steam-way in such manner as not to be pressed on forcibly, till the piston is completely out, by which arrangement the pistons are moved with facility; all which will readily be traced by a careful examination of the drawing, and it will be seen, that the edges of the pistons are grooved out in order to receive metallic packing, x, x, which is at all times pressed out by spiral springs, which are placed in suitable recesses formed in the pistons. I, I, is a steam abutment, which consists of two plates, I, affixed to the cylinder, A, by screws or bolts, with nuts, as is shewn. J, being a metallic packing, which is capable of being adjusted by means of screws, K, as is clearly shewn in the drawings, these screws passing to the outside of the cylinder, A, and, consequently, allowing of adjusting from the outside, as will readily be understood on examining the various figures of the drawing. It should be stated, that the ends of the cylinder, B, are packed by metallic packings, L, L, from the rings, L^{1}, attached to each end of the outer cylinder, and pressing on the surface of the inner cylinder at each end, by which means the annular space between the two cylinders, A, B, is kept steam tight, as is clearly shewn in the drawing. M, M, are the steam-ways, which respectively open into the steam-cylinder, A, and also into the steam-box, N, (the steam from the boiler entering at the point, O,) and the steam, after having acted on the pistons, passes away at the point or eduction way, P, and it will be seen, that by means of the slide-valves, Q, the direction of the steam may be varied as occasion may require, and the slide-valve, Q, moves in parallel guides, Q^1, and is moved by means of a pinion, R, working in the rack, Q^2, formed in the upper part of the valve, Q, as is shewn in the drawing, such pinion being affixed on the axis, R^1, which passes through a proper stuffing-box to the outside of the steam-box, as is shewn in the drawing. Now, although a somewhat similar reversing motion may have been applied to other engines of a different construction, yet I claim the combination which I have described as applied to all rotatory steam-engines having pistons sliding into, and from, the inner cylinder. It will, however, be evident, that the slide may be worked by other means, such as a rod passing through a stuffing-box in like manner to that resorted to for moving the slides of reciprocating steam-engines.

Fig. 9, shews another arrangement for moving the pistons out from the inner cylinder, and of drawing them out of action. In this figure the same letters are used to indicate similar parts, the only difference from what has been above described is in respect to the eccentric guides, which are on the end covers of the outer cylinder being dispensed with, and in place thereof there are springs, X, affixed to the outer cylinder, or they may be affixed to the annular wall of the steam-chamber, one at each end, which springs, X, offer elastic guides to the wheels on the axes of the pistons, as they require to be withdrawn, but presents a fixed resistance at its centre, thereby ensuring the entire withdrawing of the pistons when passing the steam-abutment. In this case only one wheel, G^2, is used on each axis of the pistons, and there are wheels or pulleys carried by the inner cylinder, which serve as guides to the pistons, in order to keep them to their radial. It will be seen that the moving of the inner cylinder will cause the frame or casting, X^2, to slide over the main axis, c, when the wheels of the pistons come in contact with the fixed spring, x. In each end of the frame or casting, x^2, is a slot in which the necks of the pistons, F, move towards and from the centre of the axis, c, as they are operated upon by the spiral springs, x^3, which spiral springs are recessed at that part of each of the bearings which carries the pistons, as will be clearly seen in the drawing referred to. x^4, is one of four sliding-racks, one of which is affixed to, and slides upon, each side of the frame or casting, x^2; and there is a similar arrangement at each end of the engine. x^5, is one of four pinions, one of which revolves upon each end of a shaft, which runs in suitable bearings, and carried by the inner cylinder, *b*, the sliding-racks, x^4, working into, and drawing, the pinions, x^5. Each sliding-rack is connected by a rod to the piston, and, consequently, assists the parallel motion of the pistons. x^6, is a washer or ring, which is affixed by a pinching-screw to the axis, c, of the cylinder, B, or it may remain loosely upon it, one of which washers or rings is placed on each side of the frame or casting, x^2, as guides.

Fig. 10, shews another arrangement of eccentric guides for forcing out the pistons, and for withdrawing them again out of action. In this instance, in place of having the eccentric guides fast to the end covers of the outer cylinder, the guides are affixed to a framing, or division, betwixt the ends of the inner cylinder, B, and the covers of the outer cylinder, A. In this case I employ spring-guides, x, which have play at their ends and sides, so as to give way when the wheels or pulleys of the pistons first strike against them. It will be seen that the centre of the spring, x, offers a fixed resistance, thereby ensuring the entire withdrawing of the pistons when passing the steam-abutments. The object of this arrangement is, that the guides may be more readily got at and examined than when the guides are fixed on the inner surfaces of the covers of the outer cylinder. The eccentric guides shewn in fig. 10, would be suitable for three pistons, the radial guides of which to consist of wheels or pulleys bearing upon each end of the piston, and carried by the inner cylinder, as shewn in figs. 12 and 13.

Fig. 11, shews three pistons on a smaller scale, two of them projected out, and the third withdrawn, for the purpose of passing the steam-abutments; and with respect to the steam-ways, any engineer or machinist would be competent to vary them to suit the alteration in the number of pistons employed, without departing from my principle of putting them out, and of withdrawing them, in a position not to be forcibly acted upon by the steam.

Fig. 12, shews a transverse section; and,

Fig. 13, shews a longitudinal section of a rotatory engine, differing in some degree from those above described, and relates to a mode of obtaining the requisite radial slidings of the pistons in substitution of the modes above described: in this case there are two wheels on the axis of each of the pistons, which are guided by the eccentrics, Y, affixed on the fixed shaft, Y^1, the shaft or axis of the engine being hollow, and turning on the fixed shaft, and in the bearings at each end, the outer wheels on the piston-axis working against the spring-guides, X; and it is by working between the eccentric spring-guides, X, and the cams or eccentrics, Y, that the pistons are caused to be forced out of, and drawn into, the inner cylinder, and the pistons are caused to move in correct radial directions by means of friction-wheels or pulleys, Z, the axes of which are carried by suitable bearings attached to the inner surface of the inner cylinder. It will be seen, however, that by attaching the spring-guide, X, to the fixed cams or eccentrics, Y, within the inner cylinders, figs. 16 and 17, that the outer wheels or pulleys, as well as the axis on each end of the pistons, may be dispensed with. It will further be seen, by reference to figs. 18 and 19, that a fixed guide, or eccentric, similar to that which is shewn in the drawing, may be substituted for the cams, Y, shewn in figs. 12 and 13, thereby dispensing entirely both with the springs, X, and the axes and wheels on each end of the pistons; both these modes of controlling the pistons, I also claim as my invention. In other respects, the parts are the same as heretofore explained, and are marked with the same letters of reference. In order to the affixing of any of the cams, or eccentrics, Y, on the fixed shaft within the hollow shaft, see figs. 12 and 13, it will be obvious that the inner cylinder must consist of at least three parts bolted firmly together.

Fig. 14, shews another mode of acting on the pistons, and consists in having a projecting eccentric-guide, W, affixed, or formed on, a framing, or division, at each end, betwixt the end cover of the outer cylinder, and the end of the inner cylinder, or it may be affixed upon the inner side of the end cover at each end of the engine; and in this case, at each end of the piston there are two axes, each having a wheel or pulley; by this means there is one wheel of each piston on one side, and one on the other of the eccentric-guide, and in the revolution of the axis will cause the pistons to move properly.

Fig. 20, shews a naked end view of the outer cylinder, A, and which is bored at each end a little wider than the steam-chamber, in order to form an abutment or shoulder for the ring, as shewn in fig. 21, which ring forms the wall at each end for the annular steam-chamber, and which is bolted to the outer cylinder, as is shewn in fig. 21, and entirely fills up the space at each end betwixt the inner and the outer cylinder, and is packed by metallic-packing, as before described.

Fig. 22, shews a framing to be placed betwixt fig. 21, and the end cover or lid of the outer cylinder, within which it is received and bolted to it, or it may be bolted to the wall of the steam-chamber; this framing is for the purpose solely of carrying the guides which regulate the pistons, instead of affixing them either to the end covers, or to the fixed axis, or shaft, within the hollow shaft, as described; by this arrangement, the working parts may all be adjusted, and seen at work, before the end plates or covers are affixed, which end plates or covers, in that case, have no other use than merely to serve as a casing or enclosure.

Fig. 23, shews a section of the three preceding figures, viz. 20, 21 and 22, combined. It now only remains for me to remark, that in employing the engine, above explained, as a pump for raising water, that there is to be a proper suction-way or pipe to be attached to the engine in place of the steam-pipe; and there is also to be an eduction-pipe for conveying off the water to the position required, in place of having the steam-valve, and parts shewn, all which will readily be applied and arranged by an engineer or machinist capable of making the other parts.

Having thus described the nature of my invention, I would have it understood that I make no claim to any of the parts separately, and some of the parts may be varied without departing from my invention, so long as the principle or combinations be retained. I would remark, that it is evident, that by having wheels affixed to the axis of the steam-engine suitable for railway locomotive-carriages, the engine may be applied to propel carriages, and also it will be evident, that by having any machinery properly geered to the axis of the steam-engine, the same may be applied to driving such machinery. And I would have it understood, that what I claim as my invention; is,

First, the mode of applying a series of oblique propellers, vanes, or curved blades, or screws, or portions of screws, on two shafts or axes, at a distance from each other, however such shafts are driven, where the propellers, or vanes, or screws, work between each other, whether above or below the water-line; and when using portions of screws, or curved blades only, instead of entire screws, I claim the using of them as well, not only where the vanes or propellers work between each other, but I claim them also, even if so otherwise relatively placed that the water acted on by one set is driven, or drawn, to or from the other set, and acted on thereby.

Secondly, I claim the mode of driving two shafts, or axes, having curved or oblique vanes, or propellers, or screws, or portions of screws, as before described, by means of one wheel driving two shafts, as above described, see fig. 5.

Thirdly, I claim the various modes of combining the parts of a rotatory steam-engine, as shewn and described.

Fourthly, I claim the mode of moving the pistons of rotatory steam-engines into, and out of, the inner cylinder, by means of having two wheels on each of the axis, one of which wheels moving in guides similar to E, carried by the ends of the inner cylinder; and the other wheel, G*, working in the guides similar to H, as described in fig. 7, whether the arrangement of engine be similar to that above described, or materially varied in some parts of the combination.

Fifthly, I claim the mode of placing the steam-ways, in respect to the withdrawing and projecting out of the pistons, that they shall not have to be withdrawn or projected out when strongly pressed on by steam on one side, as above described.

Sixthly, I claim the mode of constructing and combining the end plates, and end covers of the cylinder, A, see figs. 7 and 8, whereby great facility is obtained for removing either end cover and parts to which it is connected, in order to get to the inside of the cylinder, A, as is clearly shewn in the drawing.

Seventhly, in addition to my fourth claim, in respect to a mode of moving the pistons into, and out of, the inner cylinder, I further claim all and every of the other modes which I have described, however varied or interchanged the same may be, of moving the pistons and of controlling and regulating the movement of them, as the same are variously described, and seen in the various figures.

Eighthly, in addition to my sixth claim, in respect of my mode of constructing and combining the end plates of the cylinder, A, I further claim the mode of constructing and combining the end rings or plates, and framing of the engine, also before described, and shewn by reference to figs. 20, 21, 22, and 23, by which arrangement the working parts may be adjusted and seen at work by merely removing the outer cover or lid.

Ninthly, I claim the combination which I have described, and modes of reversing the steam, as applied to any rotatory steam-engine having pistons, sliding into and from the inner cylinder.

Tenthly, I claim the steam-abutment, as described and shewn in the various drawings, as combined with the mode of adjusting the metallic packing from the outside of the outer cylinder by means of the screws, K.

Lastly, I claim the mode of constructing a like engine for the purpose of raising water, as above explained; and I make each and every of the above claims, whether the arrangement of engines be similar to what I have described, or materially varied in some parts of my combination.—In witness whereof, &c.

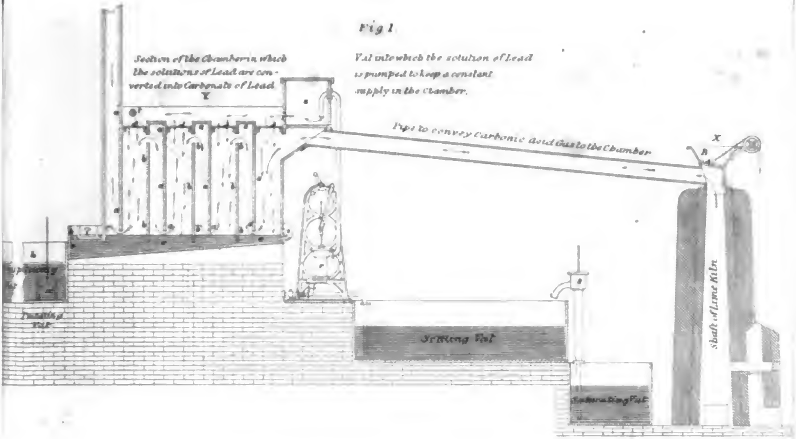
Enrolled June 1, 1839.

Specification of the Patent granted to HORACE CORY, *of Narrow Street, Limehouse, in the County of Middlesex, Bachelor of Medicine, for Improvements in the Manufacture of White-Lead.*—Sealed November 3, 1838.

WITH AN ENGRAVING.

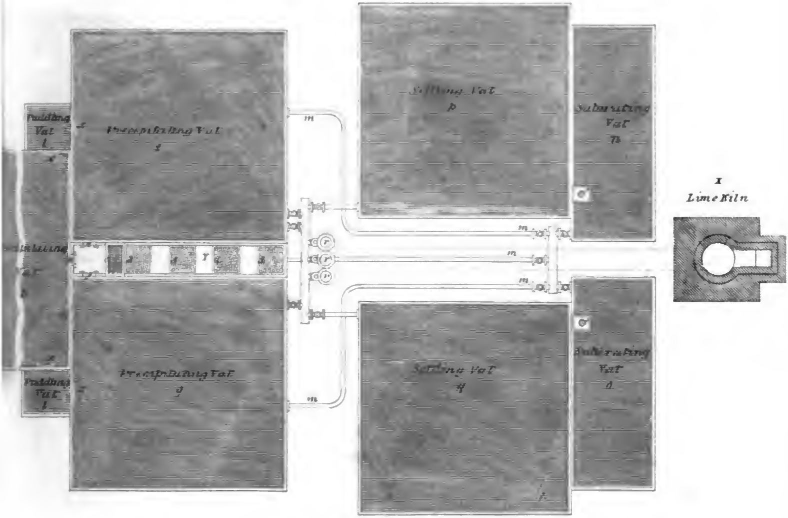
To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Horace Cory, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and

Fig 1


Section of the Chamber in which the solutions of Lead are converted into Carbonate of Lead
Y
Vat into which the solution of Lead is pumped to keep a constant supply in the Chamber.
Pipe to convey Carbonic Acid Gas to the Chamber
X
Shaft of Lime Kiln
Settling Vat
Saturating Vat
Pudding Vat

CORY'S PATENT.

Fig. 2.



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by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention relates, first, to combining the process of making white-lead with the process of making lime, whereby the carbonic-acid gas evolved in the process of making lime, is caused to act on suitable solutions of lead, and thus produce white-lead, in place of permitting such carbonic-acid gas to pass into the atmosphere ; and,

Secondly, my invention relates to a mode of submitting suitable solutions of lead to the action of carbonic-acid gas. In order to give the best information in my power, I will proceed to describe the drawings hereunto annexed, which represent my two improvements combined together.

Description of the Drawing.

Fig. 1, represents a section of the works in elevation ; and,

Fig. 2, shews a plan of them, some of its parts being in section. X, represents a section of a lime-kiln, similar to one of those known as Count Rumford's, connected with a chamber, Y, into which the carbonic-acid gas from the lime-kiln passes by a pipe, as shewn by the drawing. Y, is the chamber in which the solution of lead used in the process is submitted to the action of the carbonic-acid gas. This chamber is divided into several compartments by partitions, *a*, *a*, *b*, *b*, which are so arranged as to cause the gas to take a circuitous route before it arrives at the point, *c*, where there is an opening or way to the external atmosphere. *d*, *d*, are plates of copper or other suitable material, perforated with small holes, such plates being turned down at their edges, in order that their edges may enter loosely into grooves or troughs, thus allowing of the plates, *d*, *d*, being readily removed, should any of the holes be stopped up. The lower part of the chamber is an inclined plane, shewing the trough, *e*, *e*, and *z*, a vat by means of which a constant supply of the solution of lead is poured incessantly through the chamber. *n* and *o*, are saturating vats, in which the solution of lead is prepared. *p* and *q*, are settling vats into which the solution when prepared, is raised by the pumps, *s*, *s*, and in which it is left to settle till it becomes clear. *f*, *g*, and *h*, are the precipitating vats, in which the white-lead is first deposited, and *l*, *l*, the puddling vats, in which the white-lead is prepared for drying. *v*, *v*, and *v*, are three pumps, worked by a three-throw crank, which is to be actuated by a steam-engine or other power. These pumps have a suitable arrangement of pipes and stop cocks for communicating with the settling vats, and with the precipitating vats, and also with the vat, *z*, (as is clearly shewn in the drawing,) and in such a manner that any of the pipes or stop-cocks may be opened to or shut off from the pumps. The formation of the white-lead is thus effected: the solution of lead which is kept constantly supplied to the upper compartment of the chamber, falls through the perforated plates in minutely divided showers, as shewn by the blue arrows in fig. 1, and in that state comes in contact with the carbonic-acid gas pervading that part of the chamber below the plates, *d*; and the solution of lead descending through the chamber will be acted on thereby, and be progressively converted into white-lead; and as the gas has to take a very indirect course before it arrives at the vent, *c*, as indicated by the black arrows, it will be evident that but little will escape into the atmosphere and be lost. The solution of lead falls through the chamber into the inclined trough, *e*, *e*, from whence it will flow into one or other of the precipitating vats, *f*, *g*, *h*, according as the sluice or opening, *i*, *j*, or *k*, be open. In these precipitating vats the white-lead will settle down, and be deposited, while the solution is raised from the vat above the perforated plates, and again and again submitted to the action of the gas in the chamber, till the process of conversion is completed. The precipitation of the white-lead will take place in the vessels or vats, *f*, *g*, *h*; and when the process of conversion is completed, the liquor left after depositing its precipitate, is run off through the pipes, *m*, *m*, into the vats, *n*, *o*, to be again saturated, and the precipitated white-lead is raked into one of the puddling vats, *l*, *l*. Having thus described the nature of the parts and process, I will proceed to describe more in detail the materials and manner of working.

Preparation of the Gas.

The shaft of the kiln being filled with limestone through the hopper, B, and the shutter, A, being down, and closing the gas-pipe, the fire is to be lighted, and the process of lime making will go on as is well understood. When the fire is well lighted, the shutter, A, is to be drawn up, so that the carbonic-acid gas evolved will pass through the gas-pipe into, and through, the compartments of the chamber, Y, as indicated by the black arrows. I would here remark, that although I prefer the arrangement of the lime-kiln shewn in the drawing, I do not confine myself thereto, as the same may be varied so long as the arrangement is made suitable for conveying off the carbonic-acid gas evolved, to the purpose of making white-lead in place of being evolved into the atmosphere.

Preparation of the Solution.

The solution of lead, I usually employ, is produced by dissolving protoxide of lead, known as massicot or litharge, in acetic-acid, or in a solution of acetate of lead, all which is well understood. But I must remark, at the same time, that the following description will apply if other solvents are employed. In the saturating vats, *n*, *o*, a quantity of litharge or massicot, and a solution of acetate of lead are to be mixed, in order to produce a basic-solution of lead, as is well understood. This solution is from time to time to be pumped into the settling vats by the pumps, *s*, *s*, and in such manner that there shall be at all times a sufficient quantity of settled basic-solution contained in one of them, to be ready when required to be pumped through the chamber into any of the precipitating vats.

To work the solution in any one of the settling-vats, say, *q*, the stop-cocks of the pipes must be so adjusted, that by working the pumps, the solution will be raised and passed into the vat, z, whence it will flow through the opening, *y*, so as to keep all the perforated plates, *d*, *d*, equally and uniformly covered. It then descends through the plates into the chamber, where it will be acted on by the carbonic-acid gas, and from thence flow into any one of the precipitating-vats, say, *g*, through the sluice, *j*. And the communication with the settling-vat, *q*, being then cut off, and the cock to the vat, *g*, being opened, the solution will be again and again pumped from the precipitating-vat, *g*, through the chamber, and acted on by the gas, and returned into the same vat, *g*, and so on till the solution has been sufficiently acted on by the carbonic-acid gas. It is then allowed to settle its precipitate in the vat. After the white-lead is precipitated, the solvent is to be run off therefrom, into one of the saturating-vats (where it is again mixed with massicot or litharge,) and the precipitated white-lead is to be raked or drawn into one of the puddling-vats. The white-lead which is contained in the puddling-vat, is to be operated on in the manner which is now practised in puddling. When the white-lead has been sufficiently freed from the solution by the operation of puddling, it may be taken out of the puddling-vats, and deposited in pans to be dried in the usual way. It will only be desirable further to remark, that the solution in any other of the settling and precipitating-vats is to be worked in the same manner. Thus, it will be seen that there are always a settling-vat and precipitating-vat ready for continuing the working, whilst other of the precipitating-vats are allowing the solution to deposit the white-lead, and allowing of the white-lead being raked into the puddling-vats. It will therefore be understood that the pumps, *r*, are continually working while the process is going on; and *t*, is an overflow-pipe, by which any excess of the solution pumped up, will flow down into the inclined trough, *e*, *e*. I have stated that the solution of lead I usally employ is produced by dissolving the protoxide of lead (known as massicot and as litharge) in acetic-acid, or in the solution of acetate of lead, all which is well understood, and forms no part of my invention, similar solutions having been before prepared in the process of making white-lead, and the same have been converted into white-lead by means of streams of carbonic-acid gas, forced through such solutions when contained in a proper vessel. This part of my invention does not therefore consist of converting solutions of lead by means of carbonic-acid gas into white-lead, but only to the mode of doing so by submitting such solutions in showers, or in such like minutely divided state, to the action of the gas, whereby the process is more advantageously carried on: and I would have it understood, that although I have mentioned acetic-acid and acetate of lead, as means of obtaining solutions of basic-acetate of lead, yet I do not confine myself thereto, as other suitable solvents may be employed, and the solutions of lead so obtained, submitted to the action of carbonic-acid gas, according to my invention.

Having thus described my invention, I would remark, that although I have shewn the two parts of it as combined into one process of making lime, and of making white-lead, yet it will be evident that each may be used separate from the other, but in combination with other suitable means for performing the respective processes: thus the carbonic-acid gas of the process of lime making may be received by proper blowing-apparatus, and caused to pass into suitable vessels, containing suitable solutions of lead, and thereby convert the same into white-lead, by forcing the same through such solutions of lead, and combine such process of making white-lead, with the process of lime making, and thus beneficially use the carbonic-acid gas, evolved in the latter process. In place of receiving the carbonic-acid gas into suitable blowing-apparatus, the same may be received into a gasometer, similar to those used at gas-works, and then used in the making of white-lead. And further, it will be evident that the second part of my invention may be used with other means of obtaining carbonic-acid gas, all that is necessary being to keep a constant supply of that gas (however produced) in the chamber or apparatus, Y, shewn in the drawings: and it will readily be understood that this apparatus may be varied so long as it possesses the capability of dividing the solution of lead into minute streams or showers, and thus extending the surface acted on by the carbonic-acid gas pervading the apparatus or chamber. And I would have it understood, that what I claim as my invention is, first, the combining of the process of making white-lead with the process of making lime, whereby the carbonic-acid gas evolved in the latter process is beneficially applied, in place of permitting it to pass into the atmosphere; and,

Secondly, I claim the mode of submitting suitable solutions of lead to the action of carbonic-acid gas, as above described.—In witness whereof, &c.

Enrolled May 3, 1839.

Specification of the Patent granted to JAMES DAVIS, *late of Walcot, Place, Lambeth, in the County of Surrey, but now of Southill Cottage, Eastcot near Pinner, in the County of Middlesex, Esquire, for Improvements in the Manufacture of Soap.*—Sealed April 23, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said James Davis, do hereby declare the nature of my said invention, and the manner in which the same is to be performed are fully described and ascertained by the following statement thereof (that is to say) :—

My invention relates to a mode of combining fullers'-earth, pipe-clay, and soda, with soap. And my invention also relates to a mode of combining pearl ash, fullers'-earth and pipe-clay, with soap, and in order to give the best information in my power, I will proceed to describe various compounds of such matters with soap, applicable to different purposes; at the same time, I would remark that I do not confine myself to relative quantities of the materials hereafter given, as they may be varied; though I believe the relative quantities hereafter given to be the best for general purposes. I would further remark, that the soap with which such matters are to be incorporated, may be either in the state when it is usual to run it into frames, or it may be remelted; I, however, prefer that the incorporating the materials, as hereafter described, should take place previously to the soap being allowed to cool, in order thereby to save the fuel otherwise expended in the process of remelting. It is important and necessary to the carrying out my invention, that the soda or pearl ash employed should be submitted to calcination, by melting the same by heat, and then allowing the same to cool, when it is ground into as fine a powder as possible, and the fullers'-earth and the pipe-clay employed are to be dry and ground as fine as possible, and intimately combined with the calcined soda or calcined pearl ash, and the first mentioned materials, or one of them, and the calcined soda or calcined pearl ash are to be, when in this state of fine powder incorporated with melted soap. The object of the invention is to take soap of any of the ordinary descriptions, and by means of fullers'-earth or pipe-clay, or both, to produce a vehicle for a larger quantity of alkali, which being in the calcined state, will, with such materials, when combined with soap, produce a compound of soap which will be found of considerable value as a cleansing material, whether with sea or other water, and may be produced at comparatively small cost. I would here remark, that I am aware that various modes of combining clays and earths with soap have before been resorted to. My invention only relating to the incorporating or combining fullers'-earth and pipe-clay, when combined with calcined soda or calcined pearl ash and in the state of powder, with soap.

Description of various compounds of Soap.

In producing the various compositions hereinafter described, I manufacture soap in the same manner, in all respects, as that at present in use, up to the point when the soap is poured or cleansed into frames, or I take soap and remelt it, first, to produce a soap to be used in woollen manufactures and for washing every description of goods in salt or fresh water, and for general purposes at sea or on land, for every 126 lbs. of soap I take 56 lbs. of fullers'-earth slacked or dried, 56 lbs. of dried pipe-clay, and 112 lbs. of calcined soda, all reduced to a powder and sifted as fine as possible; I then pour the 126 pounds of yellow or mottled soap in a liquid state from the boiler into the powder composed of the above mentioned materials, and mix the soap and the powder well together by stirring and grinding, and then pour the compound-soap into frames to cool; great care should be observed in well combining the materials, and the mixing should be performed as quickly as possible before the soap cools.

Secondly, to obviate any possible objection, which might be suggested against the use of a soap or composition, partly prepared from fuller's-earth, for washing white linens, and other purposes, I produce a soap or composition for the washing of white linens, and for those purposes to which the firstly described soap or composition might possibly be considered inapplicable by the several following methods. In producing a soap or composition for the washing of white linens in salt water, or such other general purposes at sea as are hereinbefore referred to, I entirely omit the use of fuller's-earth, and for every 120 lbs. of yellow or mottled soap, I take 112 lbs. of dried pipe-clay, and add 96 lbs. of calcined soda, all reduced to a powder, and sifted as fine as possible, into which the soap is poured, and the mixture is then blended and formed for use, as before described.

Thirdly, in producing a soap or composition for the washing of white linens in fresh water, and for such other general purposes, on shore, as are hereinbefore referred to, I also entirely omit the use of fuller's earth, and for every 112 lbs. of soap, I take 28 lbs. of dried pipe-clay, and 36 lbs. of calcined soda, and all reduced to a powder, and sifted as fine as possible, into which the soap is poured, and the mixture is then blended and formed for use, as before described.

Fourthly, to produce a soap or composition for the toilet, to be used either in salt or fresh water. For every 112 lbs of curd soap, I take 28 lbs. of fuller's-earth, slacked or dried, 20 lbs. of calcined soda, and scented oil, according to fancy, the fuller's-earth and calcined soda being both reduced to a powder, and sifted as fine as possible, into which the soap is poured, and the mixture is blended and formed for use, as before described. In place of employing calcined soda, calcined pearlash may be used in precisely the same manner as that directed for the use of calcined soda ; but in about one-half the quantity, I would however remark, that I prefer the use of calcined soda for all classes of soap, where it is to be employed by persons in contact with the skin to which pearlash is irritating.

Having thus described the nature of my invention, and the manner of performing the same, I do hereby declare, that what I claim is the mode of making soap by incorporating therewith calcined soda, fuller's earth, or pipe-clay, or both fuller's-earth and pipe-clay, as above described. And I also claim the mode of making soap by incorporating therewith calcined pearlash, fuller's-earth, or pipe-clay, or both fuller's-earth and pipe-clay as above described.—In witness whereof &c.

Enrolled June 1, 1839.

Specification granted to Lawrence Rowe, *of Brentford, in the County of Middlese, Soap Maker, for Improvements in the Manufacture of Sulphate of Soda.*—Sealed April 13, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Lawrence Rowe, do hereby declare the nature of my said invention, and the manner in which the same is to be performed and carried into effect, are fully described and ascertained in and by the following statement thereof, (that is to say):—

My invention consists in a mode of applying water to the condensation of the muriatic and any other deliterious gases produced in the manufacture of sulphate of soda, that can thus be acted upon in their course through flues or passages, from the decomposing furnace to the chimney. My mode consists of a flue, leading from the furnace to the chimney over a channel, through which the water, which has been used in purifying, falls and passes away, sufficient space being allowed for the free course of the gases in the flue above the water in the channel; this flue, at the end of a convenient distance, ascends to the height of 16 feet, or any other height adapted to the scale of the works, and thence descends through a series of alternately ascending and descending chambers, forming one continued flue, which in each successive chamber, is alternately closed at the top or at the bottom. At the top, by the junction of the brick or stone-work, of which the flue may be built, with the roof of the flue; and at the bottom, by the water in the channel, which is made to rise above a hole or arch, through which it passes; but is banked high enough to prevent the escape of the gases through the same holes. These ascending and descending chambers in the flue are as numerous as the extent of the works may require; those which I have successfully used were four ascending and four descending chambers, the height of each 16 feet, and the width of the chamber two feet. The escape of the gases into the chimney can only take place after, in passing through these chambers, they have been exposed to my means of purification. In order to purify the gases by separating and condensing those which are deleterious in the course of their passage through these chambers, I place a vessel or tank of water over or above the top of the flue, with its bottom sufficiently high above the top of the flue to give full effect by height to the pressure of the water, which is made to pass through pipes down to the bottom of the chambers, where their ends or nozzles are turned up, and whence the water issues in a jet or fountain, which, by the pressure of the tank or head-water, which is kept constantly supplied, forces the jets to the top, or nearly the top, of the chambers in its ascent; it breaks, and is greatly divided, and falls back again through the current of gases which pass through the chambers of the flue. These pipes may be brought down either within or without the chambers; if within, they should be of glazed earthenware, or some material not readily acted upon by the acid gases. The size and form of the nozzle of the jet pipe may be round, or any other that will the most effectually break and disperse the particles of water, yet eject it to the top of the chamber, thence it returns in a light shower, and falls or drips to the bottom, when it will have twice passed through the gases in the flue, and presented so large a surface of particles as to cause the condensation of the deleterious gases, and bear them down to the channel at the bottom, when the water, having done its work of purification, flows off. I also invented, and have employed with success, the simple admission of water at the top through a series of short pipes from the tank into the top of each chamber of the flue, and each being fitted to a stink-trap, to prevent the escape of the gas through these pipes, the water descended into the chambers, and, falling upon some oblique boards, kept them wet and dripping, and thus increased the wet surface for the purification of the gas; but the advantage which I gain by the improvement which I have above described, is that of the double action of the water up and down each chamber, thereby greatly increasing and facilitating the purification of the gases at no greater cost than the purification by a single or descending course only.—In witness whereof, &c.

Enrolled October 13, 1839.

Specification of the Patent granted to SIR WILLIAM BURNETT, *Knight, Commander of the Royal Hanovarian Guelphic Order, of Somerset Place, Strand, in the County of Middlesex, for Destroying the Tendency of Certain Vegetable and Animal Substances to Decay.* —Sealed July 26, 1838.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said William Burnett do hereby declare that the nature of my said invention and the manner in which the same is to be carried into effect, are fully described and ascertained in and by the following description thereof, (that is to say):—

The invention consists in destroying the tendency of certain vegetable and animal substances to decay, by submitting them to the action of chloride of zinc. In preparing wood, canvas, cordage, sail-cloth, hemp, flax, wool, and other vegetable and animal matter, or articles made thereof, a tank, or other vessel of wood or other suitable material, is provided. This is to be filled about two-thirds full of chloride of zinc, dissolved in cold water, in the proportion of one pound of chloride of zinc to five gallons of water; this is allowed to remain for ten or twelve hours, when the solution will be ready. The material which is to be prepared is then placed in the solution, keeping it completely covered by the liquid. If wood or timber is to be prepared, it is to remain in the solution from ten to twenty-one days, according to its size and thickness; that is to say, if the timber be of the thickness of from 8 to 13 inches and upwards, it is to be immersed in the solution for twenty-one days; if from 4 to 8 inches thick, for fourteen days; and if less than 4 inches thick, for ten days. When the wood or timber has been so immersed, it is to be taken out and placed in a situation sheltered from the weather, until it becomes perfectly dry. In preparing canvas and cloth of hemp or wool, they are to be kept in the solution for forty-eight hours, and then dried under cover; and in this manner, other vegetable and animal materials of thin texture may be prepared. In the preparation of rope or cordage above the thickness of 2 inches, steep the hemp, or yarns of which the same is to be formed, in the solution, for 48 hours, and all rope or cordage of 2 inches or less, is to be steeped in the solution for seventy-two hours. In all cases, where tar is to be employed, the yarns forming the cordage should be placed in the solution for forty-eight hours, and allowed to dry before undergoing the tarring process. In ship-building, and in building or repairing houses, besides preparing the timber to be used therein as above described, it is desirable to use a paint, made by grinding impure oxide of zinc (lapis-calaminaris) with oil or other suitable vehicle. This paint is recommended to be applied at the time the materials are brought into contact, to the faying parts of all scarfs, and on the joists and faying parts, wherever else two pieces of timber are brought into contact, and also on the under sides of the flats of all magazine-platforms, and all other platforms below the orlops of ships of the line, and lower decks of frigates, and below the upper decks of sloops and smaller vessels. In houses, the paint, made as before stated, is to be used for the inside of skirting and wainscotting of ground floors, and upon every part of the timber materials below the external surface of ground floors.—In witness whereof, &c.

Enrolled January 21, 1839.

Specification of the Patent granted to George Robert D'Harcourt, *of Howland Street, Fitzroy Square, in the County of Middlesex, Gentleman, for Improved Artificial Granite-Stone, Marble, or Concrete.*—Sealed March 6, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said George Robert D'Harcourt, do hereby declare the nature of my said invention and the manner in which the same is to be performed, are fully ascertained and set forth in and by the following description of the mode of making my improved artificial granite-stone, marble, or concrete, and of applying the same to various purposes, (that is to say) :—

I first cast a quantity of resin into a melting-pot, and when the resin is perfectly melted, I add linseed oil or tallow thereto, in proportion to the degree of ductility I wish to give to the mixture. The quantity of oil which may be added, is from one pint to one gallon to a ton of resin, and the quantity of tallow from about one pound to eight pounds to a ton of resin. The purpose of adding the linseed oil or tallow being to give the resin such a degree of ductility as will enable it to mix with the other ingredients herein subsequently directed to be added, the exact proportions to be used will depend greatly on circumstances, and must be left to the experience and judgment of the operator. I next add to this liquidized resin about twice its weight of whiting or chalk, well pulverised, and stir or agitate the whole till the resin, the oil or tallow, and the whiting or chalk are thoroughly mixed and incorporated with one another, taking particular care to distribute the whiting or chalk as equally as possible throughout the whole mass, and that none of it is left in the state of lumps or patches. I now leave this composition or mastic to stand for about one hour, and then withdraw it from the melting-pot in the form of loaves, by means of wooden or other moulds. These loaves are now ready for going through the following additional processes, in order to convert them into artificial granite or stone. I put one or more of these loaves again into the melting-pot, and when they are perfectly melted I add well-picked oakum or other suitable fibrous substance, in the proportion of about ten pounds to a ton of the other material, stirring all the while the ingredients of the pot with a spatula or other agitator. When the oakum or other fibrous material has been well incorporated with, and diffused throughout, the mastic, I add from six to eight times the weight of the mastic of perfectly dry sand, stirring again till the sand is thoroughly mixed with the other materials. The whole of this composition or mixture is then left to boil for about two hours, after which it is in a state fit to be applied as a substitute for natural granite or stone, in manner following, that is to say:

For Pavements.

The ground having been duly prepared, a first layer of the composition is spread thereon (being taken from the melting-pot in a fluid or semi-fluid state) to the thickness of about one-fourth of that intended to be given to the whole block or stone. Another layer is afterwards added of three-fourths the thickness of the first, and its surface smoothed by means of hot irons. Railway-blocks, columns, pillars, wins, slabs, blocks for building, or other articles usually cut or hewn out of natural stone or granite, may be made of this composition by casting it in moulds of the desired shape.

To make Artificial Marble

I take the mastic or composition made as first hereinbefore directed, and melt it in a clean melting pot, taking great care in the course of melting that no particles of soot, coal, wood, or other foreign matter get into the composition, which might make the polishing of the artificial marble into which it is to be formed, difficult, if not impossible. When the mastic or composition is perfectly fluid, I add thereto thrice its weight of pulverised whiting, and stir the whole well together, after which the pot is to be left to boil for about two hours. I then add natural marble of different colours, broken into small pieces, in the proportion of two parts for each part of the resinous and chalky composition. The pieces into which the natural marble is broken must not be so large as that any of them shall get detached in the course of polishing the artificial marble, as hereinafter directed, so as to leave holes and flaws in the surface thereof. Instead of the broken marble, small pebbles, or large pebbles, or flint broken into small pieces, may be used; in which case the flint or pebbles must be perfectly clean and dry, with no particles of earth, or dirt, or sand adhering to them. This mixture must be left to boil for about an hour, and must be stirred the while, so as thoroughly to intermix and incorporate the ingredients with one another. The mode of applying this composition so as to produce an artificial marble, suitable for tesselated or other pavements, is as follows:—the ground or floor upon which it is intended to lay the pavement being duly prepared, the whole surface is to be covered with a first layer or foundation of the artificial marble composition, of about one-fourth of the entire thickness of the intended pavement.

The design or pattern desired to be given to the pavement is formed in zinc or tin moulds or frames of three-fourths the depth of the first layer or foundation, and these moulds or frames being placed upon the first layer or foundation, the fluid composition prepared as aforesaid, is to be poured into them. As soon as the contents of one set of patterns or designs is hard and dry, the metal frames or moulds are to be removed, and a further portion of the pattern proceeded with, and so on to the outer border or edge of the piece of pavement or parquetry to be formed. The surface of a pavement so formed, being perfectly dry and hard, may be ground and polished in the same way that natural marbles are polished. When the surface is made perfectly smooth, and to the eye perfectly homogeneous, a varnish of gum-lac may be passed over it. The artificial marble, whether employed for pavement or other purposes, will be, to a certain degree, of the colours of the materials of which it is composed; but in every case the appearance will be more or less that of natural marble.

And having now fully described my said invention and the manner in which the same is to be performed, I declare that what I claim as new and of my invention is the mode or modes hereinbefore described of making an artificial granite-stone, marble, or concrete. And I declare that I do not confine myself to the precise proportions of ingredients hereinbefore indicated, or the prescribed order of their addition to one another, or to the precise lengths of time which they are directed to remain combined between each operation hereinbefore described, although those which I have stated are what I would recommend, and have found in practice to be most beneficial.

And such my invention being, to the best of my knowledge and belief, entirely new, and never before used within that part of her said Majesty's United Kingdom of Great Britain and Ireland called England, her dominion of

Wales, town of Berwick-upon-Tweed, or in any of her said Majesty's colonies and plantations abroad, I do hereby declare this to be my specification of the same, and that I do verily believe this my specification doth comply in all respects fully and without reserve or disguise with the proviso in the said hereinbefore in part recited letters patent contained. Wherefore I hereby claim to maintain exclusive right and privilege to my said invention.—In witness whereof, &c.

Enrolled Sept. 6, 1839.

Specification of the Patent granted to Hugh Lee Pattinson, *of Bensham, near Gateshead, Durham, Gentleman, and* William Septimus Losh, *of Walker, Northumberland, Gentleman, for Improvements in Reducing Metallic Ores.*—Sealed April 3, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, We, the said Hugh Lee Pattinson and William Septimus Losh, do hereby declare the nature of our said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say):—

Our invention relates, first, to a mode of reducing ores of lead by dissolving such as are acted on by it, in muriatic acid, and converting the resulting chloride of lead into oxide of lead by the addition of lime or magnesia, or other earth; and,

Secondly, our invention relates to a mode of reducing ores of antimony, especially the sulphuret of antimony, by dissolving it in muriatic acid, and converting the resulting chloride into oxide, either by dilution with water, or by the addition of lime or magnesia, or other earth.

And in order that our invention may be most fully described and readily understood, we will explain the processes we have pursued and found to answer.

Description of Process to Reduce Ores of Lead into a state of Oxide of Lead.

Into a wooden vessel (lined with lead) which is capable of being closed air tight, the lead ores powdered are to be put and to be heated with muriatic-acid until nearly converted into chloride of lead. The strength of the acid we prefer is not less than 1.10. The vessel and its contents are kept heated by steam or other convenient means to about 212° Fahrenheit. In carrying on this process on galena or sulphuret of lead, sulphuretted hydrogen-gas will be evolved, which may be conveyed away by a proper pipe issuing from the air tight vessel, and used for any purpose for which it is applicable. The chloride of lead, which is very slightly soluble in cold water, is then to be dissolved in hot water in any suitable vessel of lead, and by applying cream, or lime water, or magnesia, or barytes, or other earth (we prefer lime) to the solution so obtained oxyde of lead will be precipitated. We find that one cwt. of the dry chloride of lead requires about 30 lbs. of unslacked lime. By this means we are enabled in the reduction of the ores of lead to apply the sulphur contained in the ores which contain sulphur to useful purposes and to obtain the metal from all in larger quantity and of great purity, and such is also the case in reducing the ores of antimony by a similar process as hereafter explained. And it should be stated that when it is desired to convert the oxide of lead so procured into blue lead or lead of commerce, the same is to be subjected to heat, in the ordinary way with carbonaceous matters, in a reverberatory or other suitable furnace.

Description of Process to Reduce Ores of Antimony into a state of Oxide of Antimony.

The only known ores of antimony worth reducing are the sulphurets; these are to be placed in a similar wooden vessel, as above described, lined with lead, and mixed with sufficient muriatic-acid of the before named strength to entirely dissolve the antimony, by which means we obtain liquid chloride of antimony. The mixture is heated, as before described, by steam or other convenient means. In this process, as in the former one, sulphuretted hydrogen will be evolved, and the same may be beneficially employed in making sulphuric-acid or for other useful purposes. The liquid chloride of antimony is then to be simply mixed with water, by which the antimony is thrown down as a white precipitate, or else with cream of lime, or with lime water, or magnesia, as described for the lead. The oxide of antimony so precipitated, may, if desired, be further reduced and produced in the metallic state by heating it in closed vessels with carbonaceous matters. The proportion of unslacked lime to sulphuret of antimony originally used is about 40 lbs. of the former to 90 lbs. of the latter. This varies, however, as the solution of chloride is more or less acid. We would remark that the further reduction into the metallic state, whether in respect to the lead or the antimony, forms no part of our invention, which only relates to that part of the reduction which consists in treating the ores of lead and of antimony according to the modes herein explained, without reference to the objects to which those oxides may be applied.

Having thus described the nature of our invention, and the best means we are acquainted with for performing the same, we would have it understood that what we claim is, first, the mode of reducing ores of lead into a state of oxide of lead, as above described, by converting them first into chlorides, and then decomposing the chloride so procured by lime or magnesia, or other suitable earthy matters; and,

Secondly, we claim the mode of reducing the ores of antimony into a state of oxide of antimony, by previously converting them into chlorides, and then decomposing the chloride by either water or lime or magnesia, or other suitable earth as above described. — In witness whereof, &c.

Enrolled October 3, 1839.

Specification of the Patent granted to Alexander Croll, *of Greenwich, in the County of Kent, Manufacturing Chemist, for Improvements in the Manufacturing of Gas for the Purpose of Affording Light.* —Sealed July 26, 1838.

To all to whom these presents shall come, &c. &c.— *Now know ye*, that in compliance with the said proviso, I, the said Alexander Croll, do hereby declare the nature of my said invention and the manner in which the same is to be performed are fully described and ascertained, in and by the following statement thereof (that is to say) :—

My invention applies to that part of the manufacture of gas, for the purpose of producing light, which relates to the purifying such gas after it has passed from the retorts, from which it is distilled, and the object of my invention is to separate the ammonia therefrom more efficiently, and with greater advantage, than has been heretofore accomplished. And my invention consists, first, of a mode of purifying gas by the application of certain salts.

Secondly, of modes of obtaining ammonia from the salts used in purifying gas; and,

Thirdly, my invention consists of a mode of purifying gas for the purposes of light by the application of oxygen to the sulphuretted hydrogen, to render it into sulphurous acid, and to decompose the ammonia. And in order to give the best information in my power, I will proceed to describe the processes I have pursued in carrying out my invention.

The manner of applying the salts is as follows: I take five hundred weight of nitrate of soda, or a similar quantity of nitrate of potash, and dissolve it in 250 gallons of water, which I put into a cylindrical vessel, such as is used in the wet lime-purifiers now in use at gas-works, and are well understood; through this mixture, the gas passes by the pressure from the retorts—and from the influence exerted by the soda on the sulphuretted hydrogen, and the action of nitric-acid on the ammonia, there are formed, by double decomposition, hydro-sulphuret of soda and nitrate of ammonia, and the gas then passes from this process of purification to the further process of purification by lime, as is well understood, and will not require further description; here the only difference in the ordinary gas-apparatus of a gas-work, being the introduction of suitable vessels for the purifying process, by the aid of nitrate of soda or potash; and it should be stated, that it may be desirable to have two or more vessels to contain the solution of salts above given, in order, when the liquor in one has become saturated, and requires to be drawn off, the gas may be passed through another, though this is not absolutely necessary. When the solution has become saturated, it is to be drawn off, and in order to know whether it is saturated, a piece of litmus paper, reddened by an acid, is to be opposed to a stream of gas issuing from a pipe, after the gas has passed the vessel; if the gas does not discharge the acid, and return the colour to the litmus paper, the solution may be allowed to remain longer in the vessel, until this effect on the litmus paper be produced, for the ammonia will continue to unite with the acid of the salt, until it be completely decomposed. The solution is now to be drawn off, the ammonia and sulphuretted hydrogen, are to be expelled, in order to recover the nitrate of soda, to be again used in the process of purification, which I accomplish by one of the three following processes:

First process. I put the liquor, obtained as above, into a still, which being brought up to the boiling point, the soda parts with the sulphuretted hydrogen, and combines with the nitric acid. The ammonia is distilled over with the sulphuretted hydrogen, which I receive into muriatic or any other acid, according to the salt of ammonia, I desire to obtain, and I pass the vapours below the surfaces of such acids, by a pipe or pipes, the acid used being in any suitable open vessel, and I chrystallize (to obtain the salts, as is well understood); what remains in the still is nitrate of soda, which, as above stated, may be again and again used.

Second process. After the liquor has been fully saturated with the impurities of the gas, (ascertained as before described) and has been drawn off from the purifyer, supposing nitrate of potash to be the salt, I saturate it with muriatic or any other acid; the ammonia leaves the nitric acid to combine with the muriatic or other acid; the nitric acid combines with the potash, and sulphuretted hydrogen is evolved; there remains in solution nitrate of potash, and muriate of ammonia, or any other salt of ammonia, according to the acid used, which I separate by chrystallization.

Third process. This I adopt in cases when the salt used may have become so valueless, as not to be worth the labour of reconversion. This process consists in mixing newly slacked lime, with the solution from the purifier, in a close vessel. Heat being applied to this vessel, the ammonia is evolved, which I receive into an open vessel, containing muriatic or other acid, in a similar manner to that already described in the first process.

I will now proceed to describe the third part of my invention, which consists in affording to the sulphuretted hydrogen, in the manufacture of gas for the purpose of light, a sufficient quantity of oxygen, either by the use of nitric acid or otherwise, by any convenient means of applying oxygen to this purpose, to render the sulphuretted hydrogen into sulphurous acid, and also to decompose the ammonia, as well as to increase the volume of gas. I prefer the use of nitric acid for this purpose, and I adopt the following process: I take a portion of the above acid of the specific gravity of 1·15 diluted with three times its weight of water; the gas in passing from the retorts, is to be exposed to the action of the acid, in like manner to that pursued for submitting it to the wet lime process, as is well understood; for this purpose I employ leaden vessels and pipes, to prevent the prejudicial effects of the acid, and it should be properly constructed, so as to cause the gas to pass intimately in contact with such acid. The oxygen of the nitric acid having a stronger affinity for the sulphur of the sulphuretted hydrogen, than nitrogen parts with the latter, and forms sulphurous acid; this I receive into water by a pipe or pipes, passed below the surface of water, and any part which may be absorbed by the water, will be taken up by the usual lime purifiers, through which the gas next passes, which will also purify the gas of the carbonic acid, with which it is generally, if not always, found contaminated.

Having now described the nature of my invention, and the manner of performing the same, I would remark, in regard to the second part of my invention, that the processes for obtaining the ammonia may be used in the event of employing other salts than nitrate of soda, or potash, for purifying the gas, I do not, therefore, confine the second part of my invention to those cases only where those salts (nitrate of soda or potash) are used; and further, in respect to the invention generally, I would have it understood, that I do not confine myself to any particular construction of vessels, as purifiers, though I believe those above directed to be used, to be the best and simplest for the purpose; and I would have it understood that, what I claim as my invention is, first, the mode of purifying gas, by the application of nitrate of soda or potash as above described.

Secondly, I claim the modes of obtaining ammonia, and if desirable, the salts employed in purifying the gas as above explained; and,

Thirdly, I claim the mode of purifying gas by the application of oxygen as herein described. — In witness whereof, &c.

Enrolled January 26, 1839.

SELECTED PAPERS.

Preparation of Prussian Blue. By MR. LEWIS THOMPSON.

IN the usual mode of manufacturing Prussian blue, the requisite carbon and nitrogen are obtained by decomposing animal matter in contact with potash. In this process the potash, being reduced to the metallic state, causes the formation of cyanogen, in consequence of its affinity for that substance. The quantity of nitrogen furnished by a given weight of animal matter is not large, and, in the materal employed by manufacturers, seldom perhaps exceeds eight per cent.; and of this small quantity at least one-half appears to be dissipated during the process, thus producing an enormous waste of material, and at the same time increasing the size of the apparatus. Reflecting on these circumstances, it occurred to me that the atmosphere might be made to supply, in a very economical manner, the requisite nitrogen, if allowed to act on a mixture of carbon and potash under favourable circumstances. The experiment proved on trial to be correct, and in some measure exceeded my expectation; for the carbonaceous matter employed may be worked over again many times, and is even improved by each operation. I found it necessary to use iron, for a reason which will be apparent in thr explanation of this process; when iron is not employed, a much higher temperature is required.

To produce Prussian blue, the following method may be adopted, but experience alone can teach us the best proportions; and in this, as in most of the arts, the caprice of each manufacturer will probably lead to the adoption of various proportions of the ingredients used.

Take of potash or pearlash	2 parts;
coke, cinders, or coals	2 parts;
iron turnings	1 part.

Grind the whole together into a coarse powder, and place it in an open crucible or other convenient vessel, and expose the whole for half an hour in an open fire to a full red heat, stirring the mass occasionally. During the process, little jets of purple flame will be observed to arise from the surface of the mixture; when these have almost ceased to appear, which will happen about the time specified, the whole must be removed from the fire, and allowed to cool: water is now to be added, so as to dissolve the matter soluble in that fluid, and the black matter remaining put aside for another operation. The solution, after being filtered, is to be mixed with one part of copperas, and muriatic-acid added in the usual way to brighten the color of the precipitate. The quantity of Prussian blue produced from a given weight of pearlash or potash is generally about one-fourth of the weight of the pure potash contained in the salt; but the larger the quantity operated upon at one time, the larger is the relative produce. Thus six ounces of pearlash, containing 45 per cent. of alkali, yielded only 295 grains of Prussian blue, whilst one pound of the same pearlash yielded 1355 grains. The Prussian blue here spoken of is the pure perferrocyanate of iron.

In this process the potash is decomposed by the iron, producing potassium, which, being volatile, rises and combines with the carbon of the coke and with the nitrogen of the atmosphere, the oxygen of which has been removed by passing through the fire, or by the coke or cinders. In the mixture, the cyanide of potassium thus formed, is next dissolved in water, and furnishes ferrocyanate of iron on the addition of sulphate of iron and muriatic-acid, according to the explanation given in most chemical books.

By deflagrating a mixture of nitrate of potash, coke, or small coals, and iron turnings, a mass is obtained which furnishes abundance of Prussian blue; but, in this case, the nitrogen is derived from the decomposition of the nitric-acid of the nitrate of potash, for the experiment succeeds equally well in a close vessel. In these experiments, soda may be substituted for potash without affecting the result: the charcoal from most kinds of vegetables cannot, however, be employed in place of that from coals, as it is very porous, and burns away too quickly. The presence of cyanide of sodium in barilla, kelp, and English alkali, is thus easily accounted for; and the small quantity of cyanide of potassium invariably produced during the process of preparing potassium, admits of a similar explanation.*

Purification of Copper. *By* Mr. Lewis Thompson.

The art of manufacturing copper appears to have been known from the most remote antiquity: indeed, judging from the purity of the coins and warlike instruments which have descended to us, we might at first suppose that this, like some other of the arts formerly in use, had been partially lost, and that the ancients were better acquainted with the mode of making pure copper than we are at the present day. The great purity of their cupreous alloys is, however, much better accounted for, by attributing it to the richness of the ores then in use: for, in all probability, they were unable to extract copper from such poor pyritic ore as is now employed for that purpose, and from which English commercial copper is obtained, in a state of sufficient purity for the ordinary purposes to which copper is applied. It is always, however, contaminated with the foreign matters existing in the ore: these are chiefly iron, lead, arsenic, sulphur, and antimony; carbon, too, is occasionally imparted during the process of reduction. These impurities vary from two to seven per cent., and greatly impair the ductility and malleability of the metal. With one-half per cent. of arsenic, sulphur, or antimony, copper is decidedly brittle under the hammer, and with one per cent. this effect becomes very obvious. Lead and iron have a less injurious effect; but in the proportion of two per cent., they materially affect the colour and texture, and the alloy has a harsh, dull, and mottled appearance when polished. With a very small quantity of carbon, copper is brittle, and has a gray, uneven fracture.

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* From the Transactions of the Society of Arts, &c.

The Swedish copper being almost free from these impurities has long been held in high estimation, not only in this country, but also on the Continent, where the finer kinds of brass are made almost solely with it, to the exclusion of the English copper; a cheap and effectual mode of removing the impurities from which has long been a desideratum. The following method will be found to answer that purpose, and its simplicity is such as to require no particular care or management on the part of the workmen :—

Take of impure copper .... 100 parts;
Copper scales .... 10 parts;
Ground bottle glass, or any other flux .... 10 parts;

heat the whole together in a covered crucible, and keep the copper in a state of fusion for twenty minutes or half an hour, at the end of which time it will be found at the bottom of the crucible perfectly pure. The quantity of copper scales must vary in proportion to the supposed impurity of the copper to be operated on; but the proportions here given will be found to answer very well for the average kind of English copper. The explanation of this process is sufficiently simple; the impurities contained in the copper, consisting, as we have seen, of iron, lead, arsenic, &c. combine with the oxygen, contained in the copper scales, and form oxides or acids, which are dissolved by the flux, or fly off in a gaseous form, leaving the purified copper, together with that reduced from the scales, at the bottom of the crucible; consequently, the copper obtained exceeds that put into the crucible, the gain generally averaging from one to one and a half per cent. In this way I have obtained perfectly pure copper from brass, bell-metal, gun-metal, and several other alloys containing from four up to fifty per cent. of iron, lead, antimony, tin, bismuth, arsenic, &c.

In my earlier experiments, I made use of the oxide of copper obtained from the acetate or sulphate, and proposed in practice to employ some of the native oxides of sufficient purity, such as the malachites. Mr. Aiken, however, has since kindly pointed out to me the scales of copper, as the cheapest and most abundant source for obtaining the oxide, since they are produced in large quantities at every copper manufactory. I have repeated nearly the whole of my experiments with them without observing any variation in the result, as might, indeed, have been anticipated.*

On the Disadvantage of using Black Paint on Board Ship.

There is nothing that will prove this evil more than by observing the black streaks of a ship after being in a tropical climate for any length of time. It will be found that the wood round the fastenings is in a state of decay, while the white work is as sound as ever: the planks that are painted black will be found split in all directions, while the frequent necessity of caulking a ship in that situation likewise adds to the common destruction; and I am fully persuaded, that a piece of wood painted white will be preserved from perishing as long again, if exposed to the weather, as a similar piece painted black, especially in a tropical climate.

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* From the Transactions of the Society of Arts.

I have heard many men of considerable experience say, that black is good for nothing on wood, as it possesses no *body* to exclude the weather. This is indeed partly the case; but a far greater evil than this attends the use of black paint, which ought entirely to exclude its use on any work out of doors, viz. its property of absorbing heat. A black unpolished surface is the greatest absorber and radiator of heat known; while a white surface, on the other hand, is a bad absorber and radiator of the same: consequently black paint is more pernicious to the wood than white. This may, and has been proved, by innumerable experiments; but the following simple experiment may perhaps be considered worthy of notice:—Take four pieces of tin plate and place them together in pairs, having the inner surface smeared with lard so that they may adhere together; then colour one pair black, leaving the other white, and suspend them equidistant from a small iron ball made red hot: it will be found that the black surface presented to the ball absorbs the heat, and soon gets charged sufficiently to melt the lard, and the result is that the two plates immediately separate; on the other hand, the white remains firm, as the rays from the heated body are for the most part reflected by the white surface.

The foregoing experiment plainly shews, that the wood having a black surface will imbibe considerably more heat in the same temperature of climate, than if that surface was white; from which circumstance we may easily conclude, that the pores of wood of any nature will have a tendency to expand, and rend in all directions, when exposed under such circumstances,—the water of course being admitted, causes a gradual and progressive decay, which must be imperceptibly increasing from every change of weather. The remedy to so great an evil is particularly simple; viz., by using white, instead of black paint, which not only forms a better surface, but it is a preventive to the action of heat, and is more impervious to moisture. The saving of expense would also be immense, and I am convinced that men of practical experience will bear me out in my assertion.

Two striking circumstances, which have fallen under my own immediate notice, deserve mention. The first was the state of H. M. Sloop Ringdove, condemned by survey at Halifax, N. S., in the year 1828.

This brig had been on the West India station for many years. On her being found defective, and a survey called, the report was to the effect that the wood round all the fastenings was totally decayed in the wake of the black, while that in the wake of the white was as sound as ever; a striking proof of the different effect of the two colours.

The next instance I shall mention relates to H. M. Ship Excellent, of 98 guns (formerly the Boyne).

This ship is moored east and west, by bow and stern moorings; consequently, the starboard side is always exposed to the effects of the sun, both in summer and winter. In this situation her sides were painted in the usual manner of a ship of war; viz. black and white, of which by far the greater part is black; this latter portion on the starboard side I found it impossible to keep tight; for, as often as one leak was apparently stopped, another broke out, and thus baffled the skill of all interested. In the meantime, the side not exposed to the rays of the sun remained perfectly sound. I then suggested to Mr. Kennaway (the master-caulker of her majesty's dockyard at Portsmouth), who had previously given the subject consideration, the advantage likely to be derived from altering the colour of the ship's side from black to white. Captain Hastings having approved of the alteration, the ship was painted a light drab colour where it was black before, upon which the leaks ceased, and she has now continued perfectly tight for more than twelve months; and, indeed, I can confidently state, that the ship will last as long again in her present situation, as she had begun to shrink and split to an astonishing extent when the outside surface was black, and which has entirely ceased since the colour was altered.

Instances of the injurious effects of black paint on shipping generally, also on the masts, yards, boats, &c., are of daily occurrence, and decidedly point out the benefit likely to result from the substitution of the one colour for the other, and manifest advantage to be derived from its use by the maritime interest, though I am aware some may object to its use as not being ship-shape. To such I have only to state, that the application of copper to ship's bottoms, and the use of chain for cables, have already met with the same foolish objection at the time of their introduction, since which period thousands of valuable lives, with property to a large amount, have been saved by their instrumentality.*

NOTICE OF EXPIRED PATENTS.

(*Continued from p.* 31 1.)

Joseph Crowder, of New Radford, Nottingham, Lace Net Manufacturer, for improvements on the Puslew bobbin-net machine.—Sealed May 31, 1825.

Joseph Apsdin, of Leeds, Bricklayer, for a method of making lime.—Sealed June 7, 1825.—(*For account of specification, see Repertory, Vol.* 1, *third series, p.* 204.)

Charles Powell, of Rockfield, Monmouthshire, Gentleman, for an improved blowing machine.—Sealed June 6, 1825.

Alfred Bernon, of Leicester Square, London, Merchant, for improvements in fulling mills, or machinery for fulling and washing woollen cloths, or such other fabrics as may require the process of fulling. Communicated by a foreigner residing abroad.—Sealed June 7, 1825.

Moses Poole, of Lincoln's Inn, London, Gentleman, for the preparation of certain substances for making candles, including a wick peculiarly constructed for that purpose. Communicated to him by a foreigner.—Sealed June 9, 1825.—(*For account of specification see Repertory, Vol.* 2, *third series, p.* 137.)

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* From the Transactions of the Society of Arts, &c.

John Burridge, of Nelson Square, Blackfriars Road, Surrey, Merchant, for improvements in bricks, houses, or other materials, for the better ventilation of houses and other buildings.—Sealed June 9, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 270.)

John Lindsay, of the island of Herme, near Guernsey, Esquire, for improvements in the construction of horse and carriage-ways of streets, turnpike and other roads, and an improvement or addition to wheels to be used thereon.—Sealed June 14, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 261.)

William Henry James, of Coburg Place, Winson Green, near Birmingham, Engineer, for improvements in the construction of boilers for steam-engines.—Sealed June 14, 1825.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 417.)

Jonathan Downton, of Blackwall, London, Shipwright, for improvements in water closets.—Sealed June 18, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 433.)

William Mason, of Castle Street, East, Oxford Street, London, Axle-tree Manufacturer, for improvements on axletrees.—Sealed June 18, 1825.

Charles Phillips, of Upnor, in the parish of Findsbury, Kent, Esquire, for improvements in the construction of a ship's compass. —Sealed June 18, 1825.—(*For copy of specification, see Repertory, Vol.* 2, *third series, p.* 295.)

George Atkins, of Drury Lane, Gentleman, and **Henry Marriott**, of Fleet Street, London, Ironmonger, for improvements on, and additions to, stoves or grates.—Sealed June 18, 1825.—(*For copy of specification, see Repertory, Vol.* 2, *third series, p.* 8.)

Edward Jordan, of Norwich, Engineer, for a new mode of obtaining power applicable to machinery of different descriptions.—Sealed June 18, 1825.

John Thompson, of Vincent Square, Westminster, and the London Steel Works, Thames Bank, Chelsea, and **John Barr**, of Halesowen, near Birmingham, Engineer, for improvements in producing steam applicable to steam engines, or other purposes.—Sealed June 21, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 106.)

Thomas Northington the younger, and **John Mulliner**, both of Manchester, Small Ware Manufacturers, for improvements in the loom, or machine, used for the purpose of weaving or manufacturing of tape, and such other articles to which the said loom, or machine, may be applicable.—Sealed June 21, 1825.

Ross Corbett, of Glasgow, Merchant, for a new step, or steps, to ascend and descend from coaches, and other carriages.—Sealed June 21, 1825.

Philip Brookes, of Shelton, in the Potteries, Staffordshire, Engraver, for improvements in the preparation of a certain composition, and the application thereof, to the making of dies, moulds, or matrices, smooth surfaces, and various other useful articles.—Sealed June 21, 1825.

John Frederick Smith, of Dunston Hall, Chesterfield, Esquire, for improvements in machinery for drawing, roving, spinning, and doubling cotton, wool, and other fibrous substances.—Sealed June 21, 1825.

Jean Jacques Saintmarc, of Belmont Distillery, Vauxhall, Surrey, Distiller, for improvements in the process of, and apparatus for, distilling.—Sealed June 28, 1825.

David Redmund, of Agnes Circus, Old Street Road, Middlesex, Engineer, for improvements in building or constructing ships, houses, and other buildings.—Sealed June 28, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 198.)

George Tompson, of Wolverhampton, Gentleman, for an improvement in the construction of riding saddles.—Sealed June 28, 1825.

John Heathcoat, of Tiverton, Lace Manufacturer, for improvements in the method of manufacturing of thrown silk.—Sealed July 6, 1825.

William Heycock, of Leeds, Woollen Cloth Manufacturer, for improvements in machinery for dressing and finishing of cloth.—Sealed July 8, 1825.

John Biddle, of Donnington, in the county of Salop, Glass Manufacturer, for a machine or combination of machinery for making, repairing, and cleansing roads and paths, which machinery, or part of which machinery, is or are applicable to these and other useful purposes.—Sealed July 8, 1825.—(*For account of specification, see Repertory, Vol.* 2, *third series, p.* 320.)

Molyneux Shuldham, of Brampton Hall, Wrangford, Suffolk, Lieutenant in the Navy, for improvements for the purposes of setting, working, reefing, and furling the sails of boats, ships, and other vessels.—Sealed July 8, 1825.—(*For copy of specification, see Repertory, Vol.* 2, *third series, p.* 74.)

William Furnival, and John Craig, both of Anderton, Chester, Salt Manufacturers, for improvements in the manufacture of salt.—Sealed July 8, 1825.

John Day, of Nottingham, and Samuel Hall, of the same place,

Lace Manufacturers, for an improvement on a pusher twist or bobbinnet machine.—Sealed July 8, 1825.

Walter Hancock, of King Street, Northampton Square, Middlesex, Jeweller, for an improvement or improvements in the making or constructing of pipes or tubes for the passage or conveyance of fluids.—Sealed July 16, 1825.—(*For copy of specification, see Repertory, Vol.* 4, *third series, p.* 10.)

William Hirst and **Henry Hirst**, of Leeds, Manufacturers, for improvements in the art of scribbling and carding sheep's wool.—Sealed July 16, 1825.

Henry Hirst, Manufacturer, and **George Bradley**, Machine Maker, both of Leeds, for improvements in the construction of looms for weaving woollen cloths.—Sealed July 16, 1825.

Thomas Wolrich Stansfeld, Merchant; **William Prochard**, Civil Engineer; and **Samuel Wilkinson**, Merchant, all of Leeds, for improvements in looms, and in the implements connected therewith.—Sealed July 16, 1825.

Thomas Musseeohite, of Devizes, Sadler, for improvements in the manufacture or construction of collars for horses or other animals.—Sealed July 16, 1825.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 177.)

Marc Isembard Brunel, of Bridge Street, Blackfriars, London, Esquire, for certain mechanical arrangements for obtaining powers from certain fluids, and for applying the same to various useful purposes.—Sealed July 16, 1825.—(*For copy of specification, see Repertory, Vol.* 2, *third series, p* 157.)

Thomas Sitlington, of Stanley Mills, Gloucestershire, Engineer, for improvements in machinery for shearing or cropping woollen or other cloths.—Sealed July 16, 1825.

(*To be continued.*)

PATENTS GRANTED FOR SCOTLAND.

(*From October* 26, *to November* 22, 1839.)

Alexander Borland, of Paisley, in the county of Renfrew, in Scotland, Accountant, for a machine measuring water and other liquids, and registering the quantity thereof.—Sealed October, 26, 1839.

James Smith, of Deanston Works, in the parish of Kilmadock, and county of Perth, Cotton Spinner, for certain improvements applicable to canal navigation.—Sealed October 26, 1839.

George Chapman, of Whitby, in the county of York, Engineer, for certain improvements in steam-engines.—Sealed October 26, 1839.

Samuel Wilks, of Darsleton, in the county of Stafford, Ironfounder, for improvements in boxes and pins, or screws, for vices and presses.—Sealed October 28, 1839.

Thomas Nicholas Raper, of Bridge Street, Blackfriars, in the city of London, for improvements in rendering fabrics and leather waterproof.—Sealed October 28, 1839.

Robert Edward Morrice, of King William Street, in the city of London, Gentleman, for improvements in the manufacture of boots and shoes, and coverings for the legs. Communicated by a foreigner residing abroad.—Sealed October 28, 1839.

James Smith, of Deanston Works, in the parish of Kilmadock, and county of Perth, Cotton Spinner, for a self-acting temple, applicable to looms for weaving fabrics, whether moved by hand or power.—Sealed November 1, 1839.

James Yates, of Effingham Works, Rotherham, in the county of York, Ironfounder and Earthenware Manufacturer, for certain improvements in the construction of cupola or blast furnaces for melting metals, which improvements are also applicable to furnaces, or fire-places, for other purposes.—Sealed November 1, 1839.

John Barnett Humphreys, of Southampton, Civil Engineer, for certain improvements in shipping generally and in steam-vessels, and in particular, some of these improvements being individually novel, and some the result of novel applications or combinations of parts already known.—Sealed November 1, 1839.

John George Bodmer, of Manchester, in the county of Lancaster, Civil Engineer, for certain improvements in machinery or apparatus for cutting, planing, turning, drilling, and rolling metals, and other substances.—Sealed November 8, 1839.

William Newton, of the Office of Patents, 66, Chancery Lane, in the county of Middlesex, Civil Engineer, for certain improvements in machinery or apparatus for making or manufacturing screws. Communicated by a foreigner residing abroad.—Sealed November 11, 1839.

James Sutcliffe, of Henry Street, Limerick, Builder, for certain improvements in machinery or apparatus for raising and forcing water, and other fluids, and in increasing the power of water upon water-wheels, and other machinery.—Sealed November 11, 1839.

James Ulric Vaucher, of Mount Street, Grosvenor Square, in the county of Middlesex, for certain improvements in fire-engines, and other hydraulic machines, and apparatus for raising or propelling water, and other fluids, some of which improvements are also applicable to steam-engines.— Sealed November 11, 1839.

Moses Poole, of Lincoln's Inn, in the county of Middlesex, Gentleman, for improvements in apparatus applicable to steam-boilers, in order to render them more safe. Communicated by a foreigner residing abroad.—Sealed November 11, 1839.

James Craig, of Newbattle Paper Mills, in the parish of Newbattle, and county of Edinburgh, for an improvement or improvements in the machinery for manufacturing paper.—Sealed November 12, 1839.

Pierre Auguste Ducote, of No. 70, Saint Martin's Lane, in the county of Middlesex, for improvements in printing china, porcelain, earthenware, and other like wares, and for printing on paper, calicoes, silks, woollens, oil-cloths, leather, and other fabrics, and for an improved material to be used in printing.—Sealed November 14, 1839.

John Dickinson, of Nash Mill, in the county of Hertford, Paper Maker, for improvements in the manufacture of paper.—Sealed November 18, 1839.

George Hanson, of Huddersfield, in the county of

York, Plumber and Brazier, for certain improvements in the construction of cocks and taps for drawing off liquids. —Sealed November 19, 1839.

William Wiseman, of George Yard, Lombard Street, in the city of London, Merchant, for improvements in the manufacture of alum. Communicated by a foreigner residing abroad.—Sealed November 22, 1839.

Charles Andrew Caldwell, of Audley Square, in the county of Middlesex, Esquire, for improvements in furnaces and apparatus for supplying the heat of fuel. Communicated by a foreigner residing abroad.—Sealed November 22, 1839.

Frederick Clark, of Chelsea, in the county of Middlesex, for improvements in building ships, steam-vessels, and boats, and also in the building of canal and river barges, and lighters. Communicated by a foreigner residing abroad.—Sealed November 22, 1839.

LIST OF NEW PATENTS.

Stephen George Dordoy, of Blackman Street, Borough, Chemist, for certain improvements in the manufacture of gelatine size and glue.—Sealed October 31, 1839. —(*Six months.*)

David Greenwood, of Liverpool, Millwright, and William Pickering, the same place, Merchant, for improvements in engines for obtaining power.—Sealed November 2, 1839.—(*Six months.*)

Samuel Morand, of Manchester, Merchant, for improvements in machinery for stretching fabrics.—Sealed November 2, 1839.—(*Six months.*)

Theobald Wahl, of George Yard, Lombard Street, Engineer, for improvements in boilers applicable to locomotive and other engines.—Sealed November 2, 1839.— (*Six months.*)

Alexander Angus Croll, of Greenwich, Manufacturing Chemist, for improvements in the manufacture of gas, and in reconverting the salts used in purifying gas, and improvements in the manufacture of ammoniacal salts. —Sealed November 2, 1839.—(*Six months.*)

John Cutten, of Margate, Coal Merchant, for improvements in garden pots.— Sealed November 2, 1839.—(*Six months.*)

William Hannis Taylor, of Bridge Street, Blackfriars, Esquire, for improvements in obtaining power by means of electro-magnetism.—Sealed November 2, 1839.—(*Six months*)

Frederick Augustus Glover, of Charlton, near Dover, Clerk, for an improved instrument for the measurement of angles.—Sealed November 2, 1839.—(*Six months.*)

Henry Vanner Cocks, of Birmingham, Iron Founder, for certain improvements in stoves and furnaces.—Sealed November 2, 1839.—(*Six months.*)

Henry Crosley, of Hooper Square, Leman Street, Civil Engineer, for an improved battery, or arrangement of apparatus for the manufacture of sugar.—Sealed November 7, 1839.—(*Four months.*)

James Murdoch, of Great Cambridge Street, Hackney Road, Mechanical Draftsman, for certain improvements in marine steam-engines.—Sealed November 7, 1839.—(*Six months.*)

Thomas Yates, of Bolton-le-Moors, Manufacturer, for certain improvements in the construction of looms for weaving, and also the application of the same in order to produce certain description of goods or fabrics by steam, or other power.—Sealed November 7, 1839.—(*Six months.*)

George Hanson, of Huddersfield, Plumber and Glazier, for certain improvements in the construction of cocks or taps, for drawing off fluids.—Sealed November 7, 1839.—(*Six months.*)

Thomas Whiteley and **John Whiteley**, of Stappleford, Nottingham, Lace Makers, for improvements in warp machinery.—Sealed November 7, 1839.—(*Six months.*)

John Thomas Laurente Lamy Goddard, of Christopher Street, Finsbury Square, Merchant, for improvements in looms for weaving, to be worked by steam or other power. Communicated by a foreigner residing abroad.—Sealed November 7, 1839.—(*Six months.*)

John Jones, of Westfield Place, Sheffield, for an improved table knife.—Sealed November 7, 1839.—(*Six months.*)

Edmond Moody, of Maiden Bradley, Wilts, Yeoman, for improvements in machinery for preparing turnips, carrots, parsnips, potatoes, and all other bulbous roots as food for animals.—Sealed November 7, 1839.—(*Six months.*)

Thomas Edmondson, of Manchester, Clerk, for certain improvements in printing presses.—Sealed November 9, 1839.—(*Six months.*)

James White, of Lambeth, Engineer, for improvements in machinery for moulding clay to form of bricks and tiles, and also for mixing, compounding, and moulding other substances.—Sealed November 12, 1839.—(*Six months.*)

William Chesterman, of Burford, Oxford, Engineer, for improvements in stoves.—Sealed November 12, 1839. —(*Six months.*)

Moses Poole, of Lincoln's Inn, Gentleman, for improvements in making nails, bolts, and spikes. Communicated by a foreigner residing abroad.—Sealed November 12, 1839.—(*Six months.*)

Moses Poole, of Lincoln's Inn, Gentleman, for improvements in looms for weaving. Communicated by a foreigner residing abroad.—Sealed November 12, 1839.—(*Six months.*)

William Wiseman, of George Yard, Lombard Street, Merchant, for improvements in the manufacture of alum. Communicated by a foreigner residing abroad.—Sealed November 16, 1839.—(*Six months.*)

John Burn Smith, of Salford, Manchester, Cotton Spinner, for certain improvements in machinery for preparing, roving, spinning, and twisting cottons, and other fibrous substances.—Sealed November 16, 1839.—(*Six months.*)

Miles Berry, of Chancery Lane, Patent Agent, for an invention or discovery, by which certain textile or fibrous plants are rendered applicable to making paper, and spinning into yarn, and weaving into cloth, in place of flax, hemp, cotton, and other fibrous materials, commonly used for such purpose. Communicated by a foreigner residing abroad.—Sealed November 19, 1839.—(*Six months.*)

Francis Worrell Stevens, of Chigwell, Essex, Schoolmaster, for certain improvements in apparatus for propelling boats and other vessels on water.—Sealed November 19, 1839.—(*Six months.*)

John Parsons, of the Stag Tavern, Fulham Road, Victualler, for improvements in preventing and curing smokey chimneys. — Sealed November 21, 1839. — (*Six months.*)

Robert Hawthorn, and **William Hawthorn**, of Newcastle-upon-Tyne, Civil Engineers, for certain improvements in locomotive and other steam-engines, in respect of the boilers, and the conveying of steam therefrom to the cylinders.—Sealed November 21, 1839.—(*Six months.*)

John Faram, of Middlewich, Chester, Gentleman, for certain improvements in the mode of constructing, applying, and using railway switches, for connecting different lines of railway, or two distinct railways, and for passing locomotive, steam, and other engines, and railway-carriages, and waggons, from the one to the other of such railways, and for certain apparatus connected therewith. —Sealed November 21, 1839.—(*Six months.*)

Pierre Auguste Ducote, of Saint Martin's Lane, for certain improvements in printing china, porcelain, earthenware, and other like wares, and for printing on paper, calicoes, silks, woollen, oil-cloth, leather, and other fabrics, and for an improved material to be used in printing.—Sealed November 21, 1839.—(*Six months.*)

William Danbury Holmes, of Lambeth Square, Surrey, Civil Engineer, for certain improvements in the construction of iron ships, boats, and other vessels, and also in means for preventing the same from foundering, also in the application of the same improvements, or parts thereof, to other vessels.—Sealed November 23, 1839.—(*Six months.*)

John Hunt, of Greenwich, Engineer, for an improved method of propelling and steering vessels.—Sealed November 23, 1839.—(*Six months.*)

Richard Hornsley, of Spittlegate, Lincoln, Machine Maker, for an improved machine for drilling land and sowing grain and seeds of different descriptions, either with or without bone, or other manure.—Sealed November 25, 1839.—(*Six months.*)

John Sutton, of John Street, Lambeth, Surrey, Machinist, for improvements in obtaining power.—Sealed November 25, 1839.—(*Six months.*)

James Craig, of Newbattle Paper Mill, Edinburgh, for an improvement or improvements in the machinery for manufacturing paper.—Sealed November 25, 1839.—(*Six months.*)

Arthur Collen, of Stoke-by-Nayland, Suffolk, Plumber, for improvements in pumps.—Sealed November 25, 1839.—(*Siz months.*)

James Matley, of Manchester, Gentleman, for improvements in apparatus or instruments for the cutting of cotton or wicks of lamps. Communicated by a foreigner residing abroad.—Sealed November 25, 1839.—(*Six months.*)

George Rennie, of Holland Street, Blackfriars, Civil Engineer, for certain improved methods of propelling vessels.—Sealed November 26, 1839.—(*Six months.*)

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